

SCIENCE.

FRIDAY, JUNE 10, 1887.

COMMENT AND CRITICISM.

IT IS NOT OFTEN that the average school board has the temerity to attack or seriously modify the traditional course of study. A capable superintendent or principal who is alive to newly developed needs and conditions will occasionally undertake some reform, but, save in a few of the cities of the country, even that is unusual. It is probably for this reason, as well as because of the importance of the particular case in point, that so much attention has been attracted to the action of the Boston school committee concerning arithmetic. Something over a year ago the following resolution was passed by the committee: "Whereas the study of so-called arithmetic in the grammar schools of this city covers much ground which does not come within the proper scope of arithmetic, which is the art of numbers, no small part of the time and strength of the pupils being given to merely technical application of arithmetical rules; and whereas the exercises prescribed are often difficult beyond the best conditions of mental discipline, the problems set for the pupils being really exercises, not in arithmetic, but in logic, such as pertain to a period of life several years later: resolved that the committee on examinations are requested to inquire and report whether it is not practicable to reduce and simplify the studies and exercises now prescribed under the head of arithmetic."

Afterwards Gen. Francis A. Walker drew up a series of eleven questions, and submitted them to the school principals for the purpose of obtaining specific information, and was fairly successful in the attempt. Twenty-five principals said, that, were the matter left wholly to their own judgment, they would considerably diminish the amount of arithmetic taught; twenty would not diminish it; and five would diminish it slightly. As to the character of the changes desired, there was great diversity of opinion. Thirteen would omit discount, thirteen mensuration, thirteen the metric system, — a most absurd suggestion, in view of the increasing tendency to use this system

in scientific books. Nine would do away with compound proportion, eight with exchange, seven with cube root, two with some of partial payments. Thirty-two thought the practice of memorizing the multiplication-table at first injudicious, fourteen considered it advisable, while eight gave a qualified answer. The gist of the conclusions reached is, that the study of arithmetic should be simplified by omitting various specified operations and over-difficult applications of the rest. In fact, the aim of the teacher should be, not to puzzle, but to train the pupil. That this is sound doctrine is certain, but on what application of it the metric system is omitted we fail to see.

SOME TIME AGO we had occasion to commend the action of a committee in excluding from the hall in which a teachers' association was meeting the hawkers of school-journals and school-books. We repeat now what we said then, namely, that while legitimate advertising is both necessary and useful, yet it is out of place when carried on so as to interfere with the proceedings of an association meeting. We recently saw a case in point. At a teachers' meeting not five hundred miles from this city, two agents had established themselves on either side of the main entrance to the hall, and were calling the attention of all who entered to their wares. This, within limits, is perhaps admissible; but during two admirable addresses, one on science-teaching and one on English composition, the noise at the agents' headquarters was so great that the speakers were heard with difficulty. Teachers lingered about the pile of books and papers instead of giving their attention to the exercises for which they had come together. The whole proceeding was discourteous in the extreme to the presiding officer and to the speakers, and ought to have been stopped at once. We have every reason to believe, however, that in the case of this particular association the practice will not occur again.

ON JULY 12 the annual meeting of the National educational association opens at Chicago. Generous arrangements have been made by which teachers can secure transportation and hotel accommodation at low rates, and there is every in-

ducement for teachers to attend the meeting. Perhaps the most valuable feature of the session will be the papers on industrial education, by President Walker of the Massachusetts institute of technology, and by Prof. Felix Adler of New York City, together with the discussions that will follow. But the smallest benefit to be derived from a meeting of this sort is that which comes from listening to papers and discussions. There is the stimulus that comes from seeing and meeting fellow-teachers from all parts of the country, from feeling the sense of professional co-operation. It is this which the teachers of the country most need at present, and it is this which they must have before their profession can occupy the place in the public mind that rightfully belongs to it. It is because of the part that the meeting of the National association plays in bringing about this feeling, that it is chiefly to be commended.

THE SUBJECT of the professional training of teachers is one which will bear all the discussion it can get, and Col. Francis W. Parker of Cook county Normal school, Illinois, Prof. Nelson B. Henry of the University of North Carolina, and Principal William M. Giffin of Newark (N.J.), are peculiarly qualified to write on it. To the student of education, to whom the necessity for such training is so imperative, further argument in its favor may seem useless; but it is surprising how little below the surface these arguments have as yet penetrated. In spite of all that has been so ably said and written on the subject, school boards continue to appoint untrained and incompetent persons to teachers' positions, and untrained persons continue to apply for positions which are as far beyond their capacity as those of a skilled draughtsman or electrician would be to any one ignorant of drawing or electricity. It is for this reason that the point must be unceasingly presented to the public. It must be admitted, too, that the normal schools are not in a true sense professional schools. They combine a large measure of general education with a moderate allowance of professional training. What we want is an institution or institutions that shall be as truly professional as the Harvard medical school or the Columbia law school. If the college to be opened in the autumn in this city by the Industrial education association shall occupy this place, it will contribute largely to put teaching upon a truly professional and scientific basis.

BY THE DEATH of Prof. Thomas Spencer Baynes, which was announced a few days since, the literary and scientific world is deprived of an influential and valuable worker. Professor Baynes's work is not as well known in this country as it ought to be, for the reason that much of his critical thought found expression only in articles and papers published in British magazines or in the proceedings of various associations. Professor Baynes was born in England, not in Scotland as it is sometimes supposed, at Wellington, Somersetshire, on March 24, 1823. He received his early education at the schools of Bath and Bristol, and then went to the University of Edinburgh. He sat at the feet of Sir William Hamilton, and undoubtedly received great mental stimulus from Hamilton's teaching. After taking his degree he became Hamilton's assistant. From 1857 to 1863 he was examiner in philosophy at the University of London, and was also connected with the London *Daily news*, to which he contributed many articles on the American war of the rebellion. In 1864 Mr. Baynes was chosen to fill the chair of logic and metaphysics at St. Andrews. In 1851 he had published his popular translation of the 'Port Royal logic,' which has gone through seven editions. In 1852 appeared his 'New analytic of logical forms,' being a prize essay on Hamilton's logical system, and the best exposition of it that we have. In 1874 Professor Baynes received the degree of LL.D. from the University of Edinburgh, and about that time undertook the preparation of the ninth edition of the 'Encyclopaedia Britannica.' Prof. Robertson Smith has since been associated with him as editor. Professor Baynes's most important contribution to the 'Encyclopaedia' is the article on Shakspeare, which was published in the volume lately issued.

DISTILLERY-MILK REPORT. — I.

IN seeking for information on the use of distillery swill, and its effect on the milk produced by cows to which it was fed, the results were so meagre, that *Science* determined to undertake an inquiry into the subject for itself. With this object in view, the following letter was prepared, and sent to the health officers of all the principal cities, and to the most prominent sanitarians, in the United States and Canada : —

Inasmuch as there appears to be a difference of opinion among sanitarians as to the wholesomeness of distillery waste, or distillery swill, as food

for milch-cows, some believing that milk from animals so fed is not only of poor quality, but actually detrimental to health, and even poisonous to young children, while others regard such milk as simply inferior in quality but not harmful; and inasmuch as the matter is a vital one to the thousands of children in our large cities who depend upon milk as their sole sustenance, — *Science* has deemed it of sufficient public interest to endeavor to obtain and put on record all the facts which bear on the question, and also the opinions of those whose experience and observation have been such as to enable them to express intelligent opinions on the subject. With this end in view, the accompanying questions are sent you, with the request that you will answer them at your early convenience :

1. What opportunities have you had for observing the effect of feeding distillery swill to milch-cows?
2. Please state any facts within your knowledge which will help to determine its effect on the milk.
3. What references can you give to any recorded facts in published or unpublished reports bearing on this subject?
4. What analyses can you give of milk obtained from cows so fed?
5. What is your opinion as to the wholesomeness of distillery swill as food for cows?
6. Are there any laws or ordinances in your city and state which bear on the question? If so, please send copies thereof, or, if this is not convenient, a reference to them.

To this letter many answers have been received. Some of these are from those who state that they have never had any experience with the use of distillery swill or its effects on the milk, while others give the results of the feeding of brewery grains, evidently confounding them with distillery waste, — a subject of great interest, but which is not within the scope of our present inquiry. Still other responses are from those who have had opportunities of investigating the subject and have availed themselves of them, and whose testimony is therefore of great value. In addition to this, letters have been received from physicians and others, who, while having had no practical experience with the article of food in question, are still competent to speak on the subject from their general knowledge. It is our purpose to present this testimony so far as it bears on the matter in hand, and invite criticism from our readers. It may be stated, that, from the information which has come to us, we are justified in assuming that distillery swill is at the present time being fed to

milch-cows in the following places : Baltimore, Md. ; Blissville, N.Y. ; St. Louis, Mo. ; Louisville, Ky. ; Peoria, Ill. ; Philadelphia, Penn. ; St. Paul, Minn. ; and Toronto, Can. ; and up to 1885, in Chicago, Ill. We do not suppose that these include all the places in which this food is used, but no others have been reported. If any of our readers know of other localities, they will confer a favor by sending the information. The first two questions propounded in the circular letter sent out were as follows : 1°, What opportunities have you had for observing the effect of feeding distillery swill to milch-cows? and, 2°, Please state any facts within your knowledge which will help to determine its effect on the milk.

To these the following replies were received :—

[J. L. HAMILTON, M.D., Peoria, Ill.]

I have practised medicine in Peoria, Ill., for over thirty years, — a place where more still-slop is manufactured than in any other place in the world, I suppose. For many years most of our dairies fed entirely on swill-slop. The effect on children given only this kind of milk was very noticeable; and when they got sick (as almost all of them did during the summer months), they nearly all died, unless the food was changed. As health officer, a few years ago, at a time when our city was mostly supplied with swill-milk, I visited most of the dairies, and learned the following facts : the calves of cows fed only on swill-feed would live only a short time if allowed only their mothers' milk ; that a cow brought to the dairy while with calf invariably lost it, if fed on the slop alone ; that cows kept in the dairy and fed only slop would become diseased by the second year, with a skin-disease (large scabs would appear all over them). Some of the cows I examined, and found in this condition ; and the dairymen said these cows would soon die if kept in more than two years.

[E. M. COLBURN, M.D., also of Peoria, Ill.]

I regret that I am unable to give you any reliable information, from the fact that I have never paid any particular attention to the subject. Peoria has about forty-five thousand inhabitants, is considered a healthy locality, and has probably the largest distilling interest in the United States. Nineteen-twentieths, at least, of our citizens receive their milk-supply from dairies situated from two to five miles in the country, and these all have good bluegrass pastures for their milch-cows. I think (though they deny it) that they all use slops, though only as an auxiliary to other substantial food. The proportion of slops used is so small that the subject has never been investigated here from a sanitary point of view. I have consulted

our city health officer, Dr. Thomas McIlrairie, who says, that, having never examined the subject, he has no definite opinion to give; and the same answer is made by several of our leading physicians whom I have consulted. Of course, all our physicians, when treating infants who are fed from the bottle, advise the use of pure country milk from cows not fed upon slops, which is easily obtainable here; and in consequence our experience of the ill or good effects of slop-feeding is very limited.

[NORMAN S. BRIDGE, M.D., Chicago, Ill.]

No special opportunities for observing the effect on the cows; the opportunities of a physician in general practice for observing the effect on the milk. Repeated declarations of families who have had the opportunity of using alternately and at various times milk from country dairies, and from such distillery-fed cows; which declarations are somewhat as follows: that the milk in question sours quicker than other milk; that it has an odor at times that is peculiar to it, which odor is, to some persons, very disagreeable; that the milk disagrees with and makes sick both adults and children. I have observed sick children who were, I had good reason to believe, made sick in this way. The sickness consisted chiefly in disturbances of the alimentary canal and other derangements depending on these.

[L. McLEAN, M.R.C.V.S., Brooklyn, N.Y.]

I have frequently made post-mortem examinations on the carcasses of such animals. The digestive organs of cows so fed are, as a rule, in an anaemic and atrophied condition.

[D. W. HAND, M.D., St. Paul, Minn., member of state board of health.]

Very limited. Many cows in this vicinity are fed partially on the distillery waste from numerous distilleries, but I have known of no cows fed exclusively on it. I have not been able to notice any detrimental effect on the milk.

[WILLIAM OLDWRIGHT, M.D., Toronto, Can.]

Toronto has, I believe, the largest distillery on this continent, and one would suppose we here should have no difficulty in determining the result of feeding distillery swill; but there are so many other associated circumstances, such as uncleanly surroundings, etc., that it is hard to speak positively. My opinion is, however, that milk obtained from cows so fed is bad.

[E. H. BARTLEY, M.D., Brooklyn, N.Y., chief chemist of board of health.]

Five years as milk-inspector and chemist for Brooklyn health department. Have seen swill fed, and have examined the milk. Have been in

active practice, largely among children, during that time, and have watched children fed upon such milk. Have seen two cases of sudden death from swill-milk, which have, I believe, been referred to in articles that appeared in *Science* of May 13. Have seen other cases of indigestion from such milk, which have been cured by change of milk, without medicine.

[WILLIAM K. NEWTON, M.D., Paterson, N.J., state dairy commissioner.]

I have had no personal experience with the feeding of distillery swill, but have always held that it is not only an improper food, but produces unhealthful milk. The fact that the health of cows fed on this substance is soon undermined, and that they become diseased, seems to prove that the milk produced by them must be diseased.

[J. BLAKE WHITE, M.D., New York, N.Y.]

From 1876 to 1886 was chief inspector of milk for the New York board of health. Have paid particular attention to the subject. Have seen hundreds of cows fed on distillery swill, and have noted the effects of such food on the animals' physical condition, as well as on the milk furnished by them. Have made analyses of the milk of swill-fed cows, and also microscopic examinations of same. The milk of swill-fed cows is always of an acid reaction; bluish, watery appearance; sourish, insipid taste; spoils quickly; and has an odor similar to that of the swill. The caseine is very prone to coagulate, and children are very apt to vomit it in large coagulated masses soon after the milk is taken. Analysis shows excess of aqueous element, and great deficiency in the fatty constituent. The globules of fat under the microscope have a great tendency to aggregation, instead of being individually distributed throughout the caseine investment, as in good wholesome milk. The fat-globules are also diminutive and scanty. The cows depreciate in health, are prone to consumption, become emaciated, and ulceration of the mouth, stomach, and bowels occurs; also abscesses of the liver and lungs sometimes occur.

Swill-food hyperstimulates the secretory and excretory organs, causing excessive urination, and consequent disease of the kidneys, diarrhoea and dysentery, and not infrequently degeneration of the mammary gland. Pus is sometimes found in the milk. The natural conditions of the animal's life are in every respect grossly violated by this sort of food, and the necessary consequences are deranged health, loathsome and fatal diseases, which render the secretions diseased, and the milk, *especially*, unfit for human sustenance. The

cows are forced, by this method, to become drunkards; and their milk is, without any exaggeration, positively poisonous to infants and very young children. The systems of adults are not so susceptible to the ill effects of such milk; but I am convinced that it is unwholesome, if not immediately poisonous to the human family generally.

Such milk, when given to young children, far from furnishing nourishment, rapidly undermines the constitution, and opens wide the avenue to every prevailing disease, though particularly to diseases of the digestive organs, which often terminate fatally.

Some of the most obstinate forms of cholera-infantum have been directly traced to the milk of cows fed to a great extent on brewers' grains and distillery slop, which latter is the most detrimental.

Language too strong cannot, in my opinion, be used in condemning distillery swill as food for milch-cows, and the severest punishment that the law allows is not adequate for the human brute that would wantonly inflict such cruelty on dumb animals as this method of feeding entails; but most important are the evils which milk from such sources imposes upon human beings, when sold to nourish children, thus polluting at its very source the fountain of life.

[GEORGE H. ROSE, M.D., Baltimore, Md.]

None recently. During my early life I had moderately good opportunities, but never observed any ill effects from feeding distillery swill. I may note, however, that swill was not the only food fed to the cows under my observation. They were likewise well stabled, and kept otherwise in fair sanitary condition.

[WILLIAM H. BREWER, professor of agriculture, Sheffield scientific school of Yale college, New Haven, Conn.]

By way of explanation, I may say, that, aside from my profession, I have been a member of our city board of health for about fifteen years, and its president some years, so have given the matter some thought; although there is no distillery here, and, so far as I know, no distillery milk sold in this city.

I wish to add to the notes in this circular, that I have a decided *opinion* that swill-milk is unwholesome; but this opinion is founded on general facts rather than on specific proof.

The following are among the facts inducing this belief:—

1°. That the health of cows affects the wholesomeness of their milk is proven beyond any doubt; and the health of cows fed largely or wholly on distillery swill is poor, as is abundantly shown by

their general condition and by their high mortality.

2°. It is well enough known that the food of cows affects their milk, and that their chief food largely determines its character. No one claims that distillery swill is the normal food of cows, or is wholesome food when fed in relatively large quantities. Odors of food (as of onions, etc.) show that some of the chemical compounds of the food go into the milk unchanged; and the same is shown by abundant experiment on animals. The experience with drugs (particularly the alkaloids, as morphine) with women in lactation is in the same direction, and is familiar to all medical men.

3°. When swill-milk is undergoing spontaneous decomposition, it behaves differently from normal milk: it is usually acid when drawn, while normal milk is alkaline; it behaves differently in the processes for the manufacture of butter and cheese (and therefore probably also under the digestive processes),—so differently that creameries and cheese-factories refuse it. This is universal so far as I know any thing about them. I have heard this matter discussed by butter and cheese makers; and, so far as the general facts are concerned, I think there is no difference of opinion, that, where distillery swill forms a large or chief part of the food of the cows, milk is much injured for butter and cheese; the only difference of opinion being as to whether or not some may be used along with other food without injuring the milk.

4°. We have abundant and sad proof that milk readily absorbs infections, and numerous epidemics of disease have been traced to this source. It also absorbs odors, and swill-milk stables are proverbially foul and stinking: so this doubtless adds to the possibilities of unwholesomeness.

5°. These, with other facts taken in their connection, with the scattered and more or less vague data as to sickness in specified cases following the use of swill-milk, where this seems the factor most open to suspicion,—all together make me believe, that, as compared with other milk, swill-milk is unwholesome.

6°. I have never found any facts pointing in the opposite direction. Some are negative, others point in this direction. I know of none that point positively in the opposite.

7°. The use of distillery waste for feeding cows has been more carefully and scientifically investigated in Germany (as I understand it), with the conclusion that it may be used in limited quantities, along with other food which forms the chief part of the ration, without injuring notably the milk. As I understand it, I may compare it

with the use of turnips, cabbage, etc., which make the milk 'taste,' if fed in large quantities or at indiscriminate times, but which may be fed in limited quantities, and at certain times in respect to the milking, without flavoring the milk at all. I have often heard this matter discussed among farmers and milkmen, and, similarly, I think it very probable that *some* distillery swill may be used, regulated as to the quantity, the time of feeding, and the other food which goes with it, without practically injuring the milk. But because of the difficulties of supervising the production of milk for cities, and of controlling its sale, I would forbid, under heavy penalties, the sale of all milk in cities and towns, produced by swill-fed cows, whether much or little swill was used.

I have made many inquiries among physicians on this matter, and I think the vast majority believe that swill-milk is not wholesome for children, and that this unwholesomeness is not merely negative, arising from its poverty in fat, sugar, or total solids, but that it has positively injurious qualities; and that, too, is my own belief.

[HENRY HARTSHORNE, M.D., Philadelphia, Penn.]

Dr. Bispham, a practitioner in the first ward, Philadelphia, tells me that he knows of the use of milk from cows fed with distillery swill, in families under his medical care; and that he has seen evidence that such milk is too stimulating, and unwholesome for children.

[W. SIMON, Ph.D., Baltimore, Md.]

In the spring of 1882 I gave my attention to the feeding of cattle with swill for a number of weeks, visiting the stables belonging to distilleries in and near Baltimore during feeding-time, and drawing samples for analysis. The cattle which came under my examination at the time were fed with plenty of hay and swill only, and were in a good healthy condition, notwithstanding that some of the cows had not left the stable for several months. Neither in quantity nor quality of the milk could I find any abnormal conditions.

[JAMES LAW, M.D., professor of veterinary science, Cornell university.]

Being from home, I cannot profess to answer your questions as to the effects of swill-feeding on milk as I could have done had I been beside my library. I have been accustomed to see brewers' and distillers' grains fed to milch-cows without any noticeable evil effect on the milk. If fresh, these are, in the main, grain robbed of much of its starch and some of its salts. Even when slightly acid from preservation in a closely packed condition, it has not seemed to affect the milk injuriously. It is difficult to see how the

same material, ground into a fine farina, and floating in a large amount of water, can be any more injurious, further than as the excess of the water must produce a relative diminution of the solids in the milk. But swill is not always fed in this pure and unchanged condition. As preserved for feeding-purposes, it is often found to have undergone not an acid fermentation only, but even a putrid one as well. In other cases it is alleged that it contains chemical agents of a more or less pernicious nature, that have been introduced with the object of securing a more abundant yield of alcohol from a given measure of grain; and in all such cases the milk cannot fail to be injurious in exact ratio with the baneful nature of the fermentation products, or of the chemicals introduced by the brewer. The question cannot, I think, be settled by a mere general statement of the effects of swill-feeding, but it must have reference to the condition and ingredients of any particular specimen of swill fed. I can easily understand two different observers experimenting at the same time, and reaching diametrically opposite results, because due regard has not been paid to the varying condition of the swill as it was fed, and the different conditions of life of the animals consuming it.

[D. E. SALMON, M.D., chief of Bureau of animal industry, department of agriculture, Washington, D.C.]

As I have not the exact data at hand which would be needed to answer your questions properly, I prefer to write you a short letter on the subject. In my investigations of animal diseases, I have frequently had occasion to observe the manner in which cows are stabled in sheds where distillery refuse is fed, and I also have quite a clear idea of the way in which the milk is handled. In a general way I have watched the discussions of sanitarians in reference to the wholesomeness of milk produced in this way. In some cases, at least, chemists have reported that milk from cows fed upon swill was equally rich, and, from chemical tests, was as good as, and even better than, milk produced from cows fed upon country pastures. It is extremely doubtful whether such tests as these indicate in any degree the wholesomeness of such milk. From the nature of the food, stables where swill is fed are much more difficult to keep clean, and the milk produced in them is contaminated with more filth and foreign organic matter than ever should be the case in properly kept milk-stables. This would indicate that such milk would undergo changes from the multiplication of microscopic organisms more rapidly than other milk, and that dangerous germs would be more apt to find their way into it. Some sanitarians contend that

the albuminoid constituents of swill-milk coagulate more firmly than in other milk, and that consequently it is much more difficult to digest. I have made no personal observations in regard to this, and therefore can give no personal information of value. The question is certainly an important one, and I hope you will be able to collect information which will clear up some of the disputed points.

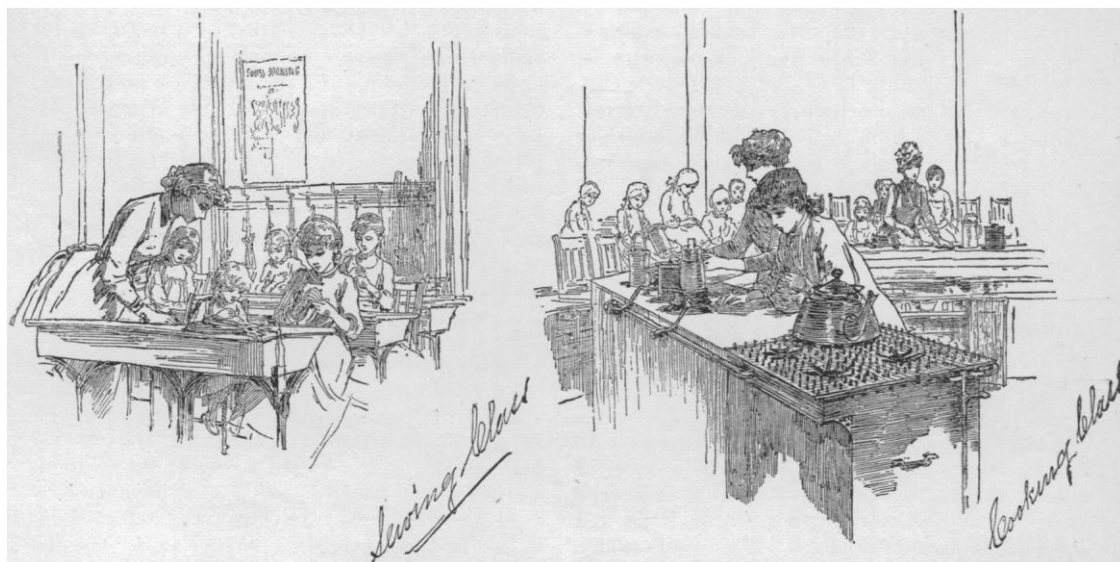
[To be continued.]

THE INDUSTRIAL EDUCATION ASSOCIATION.

THE appearance of the third annual report of the Industrial education association of New York City, and the importance of the work which it

founded, and to prevent its degenerating into careless and erratic methods of teaching, which might expose the system to misconception in its objects and operation.

It cannot be claimed that the kitchen-garden system was educational, save indirectly. It was practical philanthropy. The term seems to have originated with Miss Emily Huntington, who published a book on the subject in 1878. By 'kitchen-garden' Miss Huntington denoted an application of some details of Froebel's kindergarten system to domestic service. The association was convinced of the value of the application, and in its first annual report, made in May, 1881, was able to state that during the year the principles of kitchen-garden had been applied in



has undertaken and is accomplishing, serve to direct anew the attention of educators and teachers all over the country to a force which is growing mightier week by week, and which is making itself felt as a power for good in our educational system.

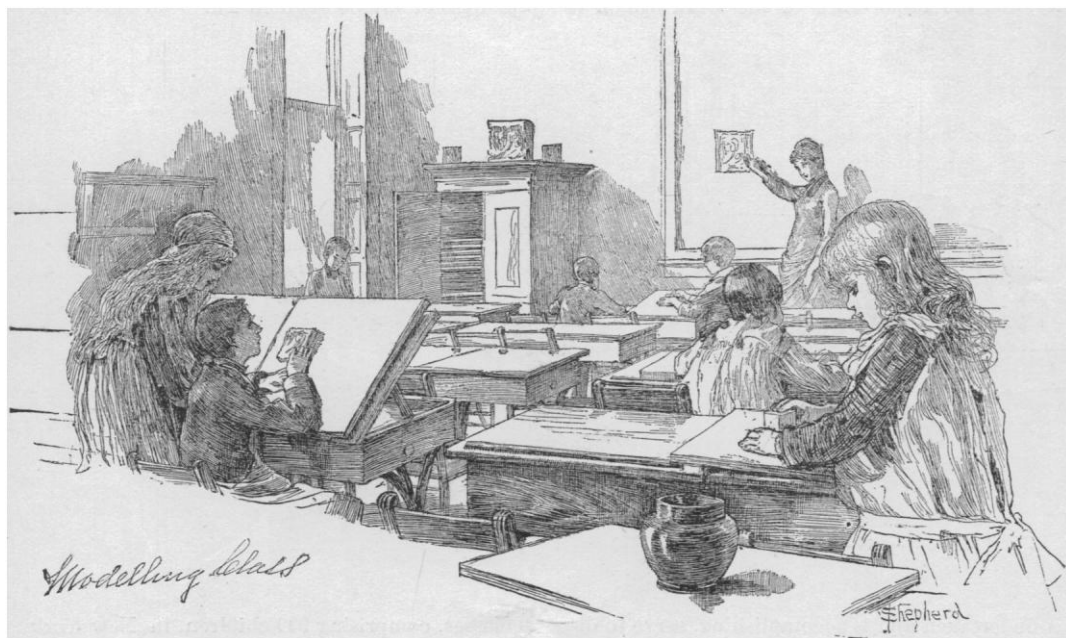
The growth of the association's work is a most excellent example of the development of an idea. In April, 1880, there was incorporated in New York City The kitchen-garden association. The objects of this association were the promotion of the domestic industrial arts among the laboring classes, by giving to the children of the same, and to such others as might be deemed desirable, gratuitous instruction in the household arts, according to the principle of the kitchen-garden system; and also to promote a wide and correct diffusion of the principles upon which the system had been

29 classes, comprising 990 children, in New York City and vicinity alone. Many other cities followed New York's example, and similar classes were reported as existing in Brooklyn, Philadelphia, Boston, Albany, Troy, St. Louis, Cincinnati, Wilkesbarre, Meadville, Newark, Poughkeepsie, Elmira, and Newport. In this initial report the same note is sounded that is heard again in the last report which has just been issued. It is that too much stress cannot be laid upon the importance of training teachers for this work. Persons must not be permitted to take it up without adequate preparation. In thus insisting on a professional training for teachers, the association, in the earliest days of its history, placed itself upon a proper plane, and made its future successful development possible. One year later, in May, 1882, one or two points of advance were chronicled.

The kitchen-garden classes had been continued in all the cities in which they had previously been introduced, and new classes had been established in Orange, Rochester, Yonkers, St. Albans, Cedar Rapids, Germantown, Chestnut Hill, and Cleveland. A normal class had been started, and was meeting with gratifying success. A graduate of the normal class had attempted an extension of the system so that it would suit boys as well as girls. While this extension had not been fully developed, yet progress was reported. The third report, issued in 1883, told of a successful but uneventful year. The fourth report, however, marks a significant stage in the association's develop-

ment, for older pupils, and for boys, be added to the present work; fourth, other systems having been developed, it seems advisable to incorporate them with our own."

In this dissolution the old was not displaced entirely by the new, but it was relegated to a subordinate position. A standing committee on kitchen-garden was provided for, and to it the direction of that work was confided. The result of the re-organization was the Industrial education association. In April, 1885, its first annual report was published; and its whole tenor indicates that a greatly enlarged work had been undertaken. In this report it is stated that the



ment. The board of managers had begun to feel that their present work was too limited, that their fundamental principle admitted of a wider application than it was receiving. This feeling found expression in a resolution passed March 21, 1884, which read as follows: "Resolved, that at the next regular meeting of the association the subject of the dissolving of The kitchen-garden association, with a view of re-organizing under a different name and upon a broader basis, be presented, and action taken thereon. It is proposed to make this change, because, first, the title 'Kitchen-garden association' is too limited in its scope; second, experience has proved that a more advanced work in addition is essential; third, it is desirable that industrial training for schools in

association was organized, first, to obtain and disseminate information upon industrial education, and to stimulate public opinion in its favor; second, to invite co-operation between existing organizations engaged in any form of industrial training; third, to train women and girls in domestic economy, and to promote the training of both sexes in such industries as shall enable those trained to become self-supporting; fourth, to study and devise methods and systems of industrial training, and secure their introduction into schools; also, when expedient, to form special classes and schools for such instruction; fifth, to provide instructors for schools and classes, and, if necessary, to train teachers for this work.

The work of the year, as might have been ex-

pected, had been largely preparatory. Industrial education had been studied, committees on specific topics organized and set to work. The conclusion had been reached that a centre should be established, where, by practical experiment, the value and feasibility of manual training could be demonstrated. To this end the association had applied to the board of education of New York City for the use of a school-building one afternoon in

to permit the use of a school-building for any educational work not wholly under its own control. During this year, also, Gen. John Eaton, U. S. commissioner of education, invited the association to prepare an exhibit for the New Orleans exposition; but it was deemed inexpedient to attempt any such exhibition at that time.

The second annual report, issued in May, 1886, of the Industrial education association, is some-

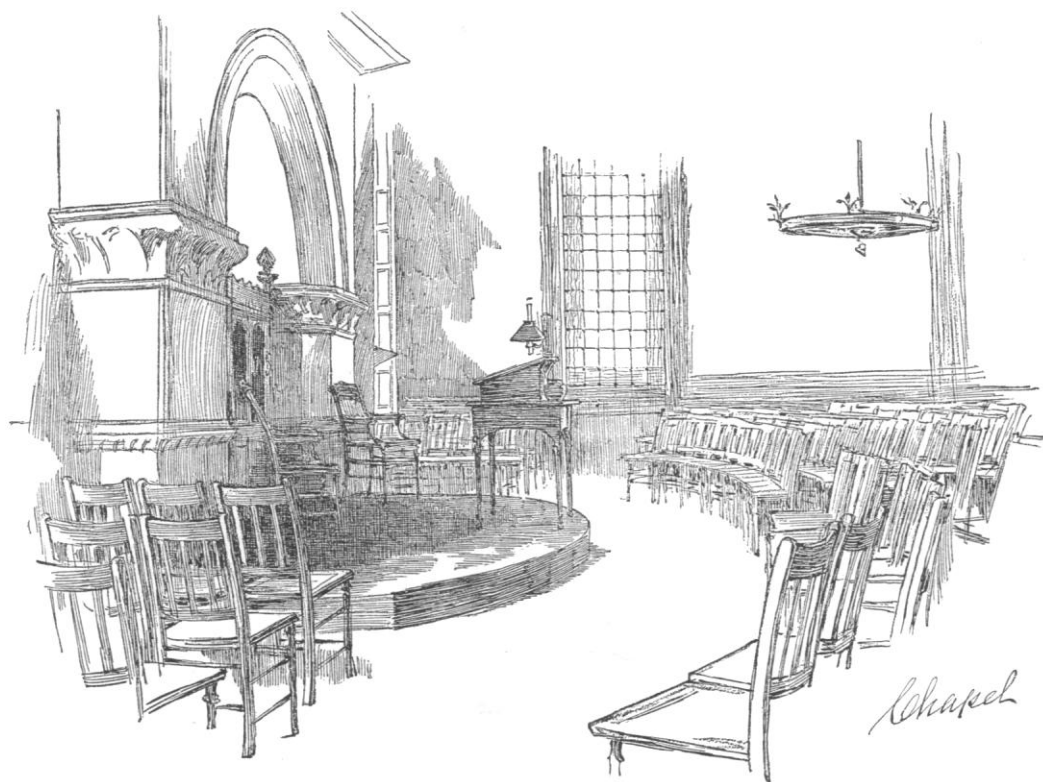


the week, for the purpose of holding classes after the regular school-hours in sewing, domestic economy, designing, modelling, simple carpentry, and the use of tools. The association offered to assume the entire care and expense, and to open the classes to the inspection of teachers, school trustees, and members of the board of education. This request was refused, and on the quite defensible ground that the board was not authorized

what more elaborate than its predecessors. The work of the association had attracted sufficient attention to incur misrepresentation, and it was deemed necessary that an adequate explanation of the term 'industrial' be given. The report insists that by this term is not meant the teaching of any trade, nor the introduction of the teaching of trades into public education. But, the report continues, quoting Mr. Washington Glad-

den, "we hold that there is an industrial training, which is neither technical nor professional, which is calculated to make better men and better citizens of the pupils, no matter what calling they may afterward follow; which affects directly, and in a most salutary manner, the mind and character of the pupil, and which will be of constant service to him through all his life, whether he be wage-worker or trader, teacher or clergyman. The training of the eye and of the hand are important and essential elements in all good

and efficient superintendent, Miss H. R. Burns, appointed to organize and develop the work. The special committee on industries had been busy investigating the practical working of the industrial feature wherever introduced into reformatories and similar institutions, and was able to report that three very important conclusions had been reached. These were, 1°, that every child in these institutions should be trained to become a producing factor in the community; 2°, that, if such training is to have permanent value in the



education. These elements the state is bound to furnish."

The objects of the association were defined anew, and the more essential of them are, 1°, to secure the introduction of manual training as an important factor in general education, and to promote the training of both sexes in such industries as shall enable those trained to become self-supporting; 2°, to devise methods and systems of industrial training, and to put them into operation in schools and institutions of all grades; 3°, to provide and train teachers for this work.

Numerous classes had been started in various branches of industrial work, and an accomplished

after-life of the child, it must be conducted on a basis of education to the child, and cannot be made to any extent a source of revenue to the institution; 3°, that the moral results of such training are most satisfactory.

Perhaps the greatest triumph of the year was the success of the Children's industrial exhibition, held under the auspices of the association. The exhibition was opened on March 31, and lasted one week. To meet the often-expressed wish that this exhibition might show the results attained in cities where industrial education has already gained a definite place in the curriculum of public instruction, special invitations were extended to

New Haven, Jamestown, Chicago, Cleveland, St. Louis, Philadelphia, Boston, Worcester, and other cities. The work of all grades of pupils, irrespective of age, was solicited with a view to showing the results possible under systematic training. To the cordial responses from these cities, as well as to the efficient co-operation of schools and institutions in and near New York, much of the success of the exhibition was due. It comprised no fewer than seventy separate exhibits from schools and institutions, representing the work of thousands of children, and one hundred and forty individual exhibits. This exhibition did a great deal to increase the popular appreciation of the importance of industrial training. The attendance of visitors was very large, numbering over seven thousand persons. The press treated the exhibition with gratifying cordiality.

Great as is the progress noted in the report of 1886, that of 1887 surpasses it. The work had now reached a still more advanced stage. Nearly a year ago the association had outgrown its quarters, and the large building, No. 9 University Place, formerly occupied by Union theological seminary, was leased for a term of years. The building was altered and refitted; and in December last, two classes in drawing, one in carpentry, one in sewing, one in cookery, together with the kindergarten and domestic training department, were in progress. In April this number had increased to seven classes in drawing, six in carpentry, six in sewing, twelve in cookery, together with the kindergarten and domestic training department. The association has had under instruction 4,383 pupils, 2,991 of whom have been members of classes held outside of the building but instructed by teachers in the employ of the association. Over 400 pupils were enrolled in vacation classes held in July and August last. A course of public lectures was given, and attracted much attention. The lecturers were President Gilman of Johns Hopkins university, Superintendents Dutton of New Haven, Balliet of Reading, Calkins of New York, and Barringer of Newark, Col. Francis W. Parker of Cook county Normal school, Illinois, Dr. Henry H. Belfield of Chicago, Dr. Nicholas Murray Butler of Columbia, and Mrs. Mary Dana Hicks of Boston. A museum has been opened — which will be largely augmented in the autumn — which serves as an object-lesson in industrial education. It is always open to visitors, and many teachers and other interested persons visit it daily. From it the eye takes in at a glance the possibilities resulting from the combination of manual and mental exercises, and sees how they supplement and depend upon each other. The museum comprises at present some twelve sepa-

rate exhibits of drawing, together with specimens of carpentry, joinery, lathe and forge work, representing the Chicago public schools, Worcester high school, Montclair public schools, New Haven public schools, Hebrew technical institute, College of the city of New York, Baltimore manual-training school, Chicago manual-training school, and the Woman's institute of technical design. Still other exhibits are in course of preparation.

A library fund has been secured, and by fall a large reference and circulating library of educational works will be at the disposal of teachers and students. But the most important of the new features is the establishment of a college for the training of teachers. This will open in September, and a circular of information has already been issued. This college will aim eventually to become a professional school for teachers, not a mere normal school in which education and preparation for teaching go hand in hand, but a professional school in the sense that a law-school or a medical college is a professional school. As the law-school has its moot courts and the medical school its dissecting-room, to combine practice with theory, so this college will have its model school.

In this model school the training which the association advocates will be given, — here the new system, which combines the old and the new, will be taught, — and the association hopes to have in it a strong confirmation of the belief which it strives to propagate.

Dr. Nicholas Murray Butler of Columbia has been elected president of the college, and will also hold the professorship of the history and institutes of education. The other positions on the faculty are being rapidly filled, and that professional school which all live teachers have long hoped for will soon open its doors to properly qualified applicants. The college-building, No. 9 University Place, contains a large lecture-hall, in which a series of free lectures will be given. Monographs on educational topics will also be issued from time to time, and several have been already arranged for.

The statement of principles which the Industrial education association issued recently is a most excellent pedagogic creed. It should be carefully perused by every teacher. The substance of it is as follows: —

The association holds, —

1. That the complete development of all the faculties can be reached only through a system of education which combines the training found in the usual course of study with the elements of manual training.
2. That the current system trains the memory

too largely, the reasoning-powers less, the eye and the hand too little.

3. That industrial training, to have its fullest value, must be an integral part of general education. While valuable in some measure alone, it is alone little better than manual training as leading to the learning of trades.

4. That it is not the aim of the association to teach trades. That boys and girls will, if educated according to the system which it advocates, be better able to take up the study of any particular trade, it recognizes as one of the results of the system. It is the development of all the faculties which it holds to be the essential aim of the system.

5. That the fact is generally recognized among those best informed on the subject of education that the kindergarten system produces the best results with young children. The association claims that the system which combines industrial training with the usual and necessary branches is nothing more than a development of the kindergarten theory, — a system found wise for young children modified and adapted to children of more mature growth.

6. That it holds the belief, that as children, wherever found, possess the same faculties and develop the same characteristics, this system should be introduced into all classes and grades of schools, the private as well as the public school, and not alone in the primary public schools, but in all those of more advanced grades.

7. It holds that this system tends to the development of certain moral qualities as well as to the development of the intellectual faculties.

8. That the various occupations which are by this system given to the children, render study less irksome than any system can in which the exercise of the faculty of memory is alone involved.

9. That there exists in this country a widespread disinclination for manual labor which the present system seems powerless to overcome. There is a wide range of occupations which our boys and girls might with advantage enter were it not that they are prevented from doing so by a false view of the dignity of labor. That one of the results of this system of education will be to destroy a prejudice which in a measure arises from a want of familiarity with hand-work.

The accompanying illustrations will give some idea of the way in which the present work is being carried on. In the autumn a marked change will take place, and children will only be found as pupils in the model school. The pupils in the college will be persons preparing for the profession of teaching.

NOTES AND NEWS.

THE annual convocation of the regents of the University of the state of New York will be held at the capitol building, Albany, on Tuesday and Wednesday, July 5 and 6. The papers to be read are, 'The education of the working-classes,' by the Rev. Luke Grace of Niagara university; 'The teaching of mental science in schools,' by Principal Samuel Thurber, Milton, Mass.; 'The study of law as a part of general education,' Prof. F. M. Burdick of Hamilton college; 'Moral training in schools,' Principal Eugene Bouton, New-Paltz normal school; 'The newspaper as an educator,' Regent W. A. Cobb, Lockport, N.Y.; report of committee on necrology, by Assistant Secretary Albert B. Watkins, Ph.D.; 'Private librarian,' by the Rev. Ezekiel Munday, librarian of city library, Syracuse, N.Y.; 'Overcrowding of school courses,' by Principal George A. Bacon of Syracuse high school. Andrew D. White of Cornell university will make an address on Wednesday evening. Thursday will be devoted to conference on the requirements for admission to college between a committee from the associated high-school principals of the state of New York and representatives of the college faculties. The committee from the high-school principals includes Prof. O. D. Robinson, Albany high school; D. O. Barto, Ithaca high school; C. T. R. Smith, Lansingburg academy; Arthur M. Wright, Waterville union school; Henry W. Callahan, Penn Yan academy; D. C. Farr, Glens Falls academy; C. H. Verrill, Delaware literary institute; ex-Principal Noah T. Clark of Canandaigua; H. P. Emerson, Buffalo high school.

— The Wisconsin state superintendent of public schools has done what seems a most excellent thing. A similar custom may prevail elsewhere, but, if so, we have never noticed it. He has issued in pamphlet form all the laws relating to public schools passed at the last session of the state legislature. The pamphlet contains a copy of each law amended as it now reads, and a copy of each additional statute passed at the session of 1887. The plan is an excellent one, and should become general.

— Thomas M. Balliet has been re-elected superintendent of schools of Reading, Penn., for a term of three years.

— The Newark (N.J.) board of education had another acrimonious discussion over Barnes's 'History of the United States.' Although the book was bitterly assailed by some members of the board, it was finally adopted as a text-book in the city schools.

LETTERS TO THE EDITOR.

*.*The attention of scientific men is called to the advantages of the correspondence columns of SCIENCE for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

A folk-lore and dialect society.

YOUR editorial comment on the proposition to found a folk-lore and dialect society in this country is, in my opinion, exceedingly opportune. When the American historical association was organized a few years ago, your correspondent and Prof. H. B. Adams exchanged views on the feasibility of establishing such a society as auxiliary to the work of the association. The plan, however, fell to the ground, until, a few weeks ago, a gathering of scholars interested particularly in American folk-lore met at Cambridge, Mass., and formed the nucleus of a promising society for its investigation. The invaluable work accomplished by the English dialect society, and by such publications as *Melusine* in France and Germany, shows what intelligent effort can do in this direction to save from oblivion the relics, linguistic and superstitious, of the past. All philologists know that the study of dialects — dialectology — is of extreme importance to the scientific linguist; for in the dialects are often found archaic pronunciations, idioms, usages, which point to a more ancient time than the pronunciations, idioms, and usages prevalent among those who speak the standard tongue. In this manner, dialect studies in modern Greek, modern Italian, Spanish, and German have contributed abundantly to the explanation of phenomena in those languages otherwise inexplicable. In this country, where dialects were supposed to be non-existent, or to have been obliterated by the levelling influence of the common school, they are really found, on closer inspection, to abound. Noticing this many years ago, the subscriber contributed to the *Baltimore journal of philology* (iii. No. 2) a paper on 'The Creole [negro] patois of Louisiana,' which was part of a plan to embrace studies in 'Greaser Spanish' (Texas, New Mexico, California), 'The Hoosier dialect of the middle states,' 'The cracker dialect of Georgia, East Tennessee, and North Carolina' (as outlined by R. B.), 'Pennsylvania Dutch' (after Holdeman), 'New Englandisms,' and 'Negro English.' The first and last only of this series have been as yet, though very imperfectly, executed. The essay on negro English was about fifty pages octavo in length, and was published in full, as a tolerably complete grammar of negro, in *Anglia* (Leipzig, Germany, 1884). A *résumé* of it was read before the American philological association, which met at New Haven in July, 1885; and a brief abstract of the paper appears among its Proceedings for that year. Negro usage abounds with linguistic curiosities, obsolescent idioms, twists and turns descended from the Elizabethan or Jacobin settlers; and along with these goes a world of quaint superstitions, proverbs, charms, 'saws and sayings,' that reveal a peculiarly naïve and old-world turn of mind and imagination. The Society for psychical research ought certainly to investigate this *terre vierge*, rich with the stratified folk-lore of ages, enamelled with flowers of African parentage, replete with scraps of custom and myth which might throw

light on the prehistoric period in the life of nations. A sojourn at the Virginia Springs might open to the attentive folk-lorist of the north, armed with a memorandum-book, stores inexhaustible of southern *mährchen*; for here southern society congregates, conversation is still a fine art, and the long evenings of summer are most provocative of meditative reminiscence. Mr. Gomme's proposed manual for the scientific gathering and classification of all this legendary lore will doubtless prove priceless to such summer sojourners. The south is peculiarly fertile in all the conditions through which the curious beliefs, customs, and narratives you editorially comment upon are handed down from generation to generation; nay, are even generated under our very noses. Let the Folk-lore society and the American dialect society come and gather while the hills are white with harvest. It requires no exceptionally gifted pen to take down what one hears and sees all around one. A series of intelligently articulated circulars, with pregnant hint and clear suggestion, sent out under the auspices of these societies, would doubtless elicit lists of words and descriptions of customs and folk-lore prevalent in particular localities, and these could gradually be elaborated and systematized into a volume. By all means, let these societies go to work without loss of time, and both co-operate to a common end.

JAMES A. HARRISON.

Washington and Lee Univ.,
Lexington, Va., June 1.

The idea of a civil academy.

THE idea of a civil academy at Washington, as developed by Dr. Herbert B. Adams, in Circular of information No. 1, 1887, bureau of education, seems to have met with a varying reception from the public press. Condemned by some journals and highly commended by others, the conspicuous attention which it has attracted is the best proof that it is not a mere Utopian dream.

I believe myself that a civil academy is not merely desirable, but that in the no distant future it will be a necessity. The opinions of many government officials who have held positions of administrative responsibility justify this statement. Only recently a gentleman who has long been prominently connected with the public service expressed the conviction that he would yet see the bulk of the higher offices distributed on the basis of competitive merit, in place of being bestowed as the reward of political labors. However this may be, there can hardly be any doubt that civil-service principles have come to stay; and the significance of this fact in the present connection is that a strong demand is thus created for men thoroughly trained and specially fitted, particularly for higher branches of government work. The sentiment has been well expressed by Col. Carroll D. Wright, whose fifteen years of public administrative experience should entitle his views to considerable weight. In an address recently delivered before the joint session of the American historical and Economic associations at Cambridge, on the study of statistics in colleges, he said, "The extension of civil-service principles must become greater and greater, and the varied demands which will be created by their growth logically become more exacting; so that the possibilities within the application of such principles are therefore not ideal, but practical, in their nature. And these

potentialities in the near future will enhance the value of the services of the trained statistician. The consular and diplomatic service, as well as other fields of government administration, come under the same necessity."

One of the objections urged against the civil academy is that we have already plenty of colleges, amply equipped with facilities for political education, — a point which is sufficiently answered by the distinction between 'political science' and 'political praxis.' Political science can be acquired in a tolerably satisfactory manner in many of our institutions of learning, but political praxis is the special product of contact and experience with administrative work. An academy in Washington, with the most favorable environment that could be found, for the prosecution of theoretical studies, and which furnishes contemporaneously the opportunity for apprenticeship work, manifestly embodies the ideal thing.

Without contesting what seems to be a favorite proposition with many journalists, that 'American statesmen come up from the masses,' that they, like poets, are born, not made, it is only fair to add that the country has likewise suffered much from assumed heaven-born genius in high places. This fact we are too apt to lose sight of, and think only of conspicuous examples of statesmanship where the only educational training has been the village school. Is it not true that more statesmen who have come up from the masses have turned out to be incubi to congressional society than glittering lights in the political firmament? No argument can be founded upon the statement before mentioned, for it is certain that no genius would be spoiled by scientific political study; that much might be developed that otherwise would never be utilized.

The strong point of the civil academy is its practical side. Leaving out the disputed question of government aid to higher education, there can be no doubt of the wisdom of expenditure which will create trained and skilful administrators. Colonel Wright says, "The government should supplement college-training with practical administrative instruction, acquired through positive service in its own departments." Statesmen may be born, but administrators must be made. What may be understood as technical training is as much required for them as for the army and navy officer. Whether we will or no, the complexity of modern state life is increasing, is certain to increase still more, and

we must prepare to meet the change. I do not think we can check the growth of state interference in matters which were once considered of purely personal and private concern, but we can and must regulate it. How? In two ways, — by multiplying the means for obtaining accurate information upon economic and social conditions, and by basing legislation upon ascertained facts. Congressmen must be able to do more than put themselves 'on record' in favor of labor: they must grasp the true inwardness of the labor-problem in its details. Administrators must not be content with the performance of perfunctory duties: they must be ready, when called upon, to furnish facts suggestive of useful constructive legislation. The training of both must be provided for, and the civil academy offers the combination of advantages to be desired.

E. R. L. GOULD.

Washington, D.C., June 4.

Sea-sickness.

It is true that many deaf-mutes are known to have enjoyed what seems to be a surprising immunity from sea-sickness; but it cannot be said, that, as a class, they are exempt from the misery we all so much dread.

I travelled last summer on the Pacific Ocean with a number of deaf-mutes, some of whom paid their tribute to Neptune with the best of us who hear.

It is my opinion, however, that there is ground for Dr. James's statement (*Science*, June 3), if care be taken not to say that a deaf-mute cannot be made sea-sick.

If I may say a word from my own experience of a number of ocean-voyages, with a decided tendency to be sea sick, I think great help may be had by keeping in one's berth at the first approach of rough weather, eating moderately, and not rising until the processes of digestion and assimilation have had time to be quite fully completed after at least two or three meals.

E. M. GALLAUDET.

Kendall Green, Washington, June 4.

Garbage-disposal.

Your note as to garbage-disposition in Milwaukee does not express the present state of affairs. The health officers of the surrounding towns have forbidden the entrance of garbage-wagons into their districts. At present many plans are under discussion, but none has yet been fixed upon. The furnace plan finds much favor.

ARTHUR STEVENS.

Milwaukee, Wis., June 4.

CROSBY'S VITALIZED PHOSPHITES

Composed of the Nerve-giving Principles of the Ox Brain and the Embryo of the Wheat and Oat.

Is a standard remedy with physicians who treat nervous or mental disorders. The formula is on every label. As it is identical in its composition with brain matter it is rapidly absorbed and relieves the depression from mental efforts, loss of memory, fatigue or mental irritability.

Sleeplessness, irritation, nervous exhaustion, inability to work or study is but BRAIN HUNGER, in urgent cases BRAIN STARVATION. It aids in the bodily and wonderfully in the mental development of children. It is a *vital* phosphite, not a laboratory phosphate or soda water absurdity.

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SCIENCE.—SUPPLEMENT.

FRIDAY, JUNE 10, 1887.

ASPECTS OF EDUCATION.

REALISM.

SHELLEY, once writing to Godwin, expressed his surprise that so much time and thought had been given to the teaching of words, and so little to the teaching of things. Under the influence of Sturm and the Jesuits, humanism, or classical education, degenerated into a mere study of words. Little attention was paid to what was said: the chief point was how it was said. Cambridge undergraduates thirty years ago, taught by the most distinguished scholar in the university, when they read a Greek play or a Latin poem, heard little about the plot, or the allusions or their relations to modern writings of the same kind. Attention was exclusively paid to readings, to the delicate variations in the meanings of words, to grammatical forms, to letters and accents; yet the teacher was a man full of love of English and other literatures, and steeped in the knowledge of them. The best scholars turned out of the university were surprised to find, as a result of their training, how little they knew of the literary masterpieces, which they had spent a great portion of their lives in learning to construe. The main aspects of ancient life were entirely unknown to them, unless accident had led them to learn them. Yet the teaching of things rather than words had been advocated by great educationalists, both abroad and in England.

The typical realist in education is Comenius. His whole life was devoted to the improvement of educational methods. He was one of the first to appeal to the eye as an instrument of instruction; but his most important work was the 'Great didactics,' a complete treatise on the art of education. The central idea of this book was that the education of every man should follow his natural growth. Take the whole circle of sciences with which the mature man can be acquainted, — arithmetic, geometry, astronomy, ethics, politics, and many others, — what are these but names for departments of knowledge, which the human mind creates for itself? If we take away from them their repulsive appellations, and consider them in their simplest elements, we find that they are nothing but what

the child learns from its earliest infancy. 'Metaphysics' is a hard word, yet what is it except the science of ideas as apprehended by the mind? A child four years old was once lying in bed, recovering from an illness, when its father and mother came to the bedside. The child described the feeling it had in its leg. The father said, "That is pins and needles." The child thought to itself, "How can my father make so rash a statement? What he means, expressed in accurate language, is, that what I am describing sounds to him as the sensation which, if he felt, he would call pins and needles; yet how can he tell that the sensation which I am now feeling is the same as that which he denotes by that name?" There was present to the child's mind the whole problem of the relativity of knowledge, yet that has sometimes been found hard even for men to grasp. In the same way, what is the knowledge of natural phenomena, such as fire, rain, and snow, but the knowledge of physics? What is the ability to find his way about his own village but the rudiments of geography? What are his family annals but the beginnings of history? The government of the household would teach him domestic economy, the administration of his native town would teach him politics, the rules of simple behavior would teach him ethics: take away the bugbear of repulsive nomenclature, and you will find every science can be studied in its simplest elements from the beginning of life. Comenius regarded the sciences which were accessible to human knowledge as an ever-widening circle, to be learned by child, boy, and man in the measure for which their strength is adapted. When it is possible in this way, by following the course of nature itself, to arrive at the knowledge of every thing that is worth knowing, why should we confine the growing mind in the trammel of mere language? From the mother's school the child would pass to the national school; one existing in every house, the other in every parish. From this he will go, as years advance, to the gymnasium, which is to be found in every large town; and thence, if strength admits, to the university, which exists in every province.

The didactic theories of Comenius met with a strange fate. His manhood was nearly coincident with the thirty-years' war, which made educational experiments impossible in Germany. He came to England just as the civil war was breaking out. That did not prevent his proposals from

attracting the attention of the parliament; and they would have given him for his experiments some large college, either in town or country, had not political troubles made it impossible to do so. He was taken up by the Protestant powers of Europe, partly because they represented the greater spirit of progress, and partly because they were opposed to the exaggerated humanism of the Catholics. Had he lived a hundred years earlier, the effect of his teaching would have been far more powerful. Had Comenius, instead of Melancthon, been the preceptor of Germany, Catholics and Protestants might have been divided in education, as they were in religion, but the world would have been enriched by a training of wider scope and greater possibilities. Thwarted by the political troubles of his time, his teaching never arrived at its full development, and had little effect upon the world until it received a new shape at the hands of Pestalozzi and Froebel.

The learning of things instead of words found a powerful advocate in England in the person of John Milton. His 'Tractate on education' is one of the most gorgeous dreams of a complete training ever conceived and elaborated by an educational theorist. He admits that it is right to learn the languages of those people who have at any time been most industrious after wisdom, but he asserts that language is only the instrument which conveys to us things useful to be known. "Though a linguist," he says, "should pride himself to have all the tongues that Babel cleft the world into, yet, if he have not studied the solid things in them as well as the words in lexicons, he were not so much to be esteemed a learned man as any yeoman or tradesman, competently wise in his mother dialect only." He defines a complete and generous education as that which fits a man to perform justly, skilfully, and magnanimously all the offices, both private and public, of peace and war. The Latin language, taught with the Italian pronunciation, is to lay the foundation of good morality, "infusing into their young breasts such an ingenuous and noble ardor as would not fail to make many of them renowned and matchless men." Varro and Columella are to teach, not only Latin, but agriculture, — how to recover the bad soil and to know the waste that is made of good. Aristotle and Pliny are to give instruction in science. Mathematics, comprising arithmetic, geometry, astronomy, and trigonometry, have a separate course of their own, from which progress is to be made to fortification, architecture, engineering, and navigation. Theoretical studies in these and other similar branches are to be supplemented by practical training given by experts in the several pursuits. Not until this

broad foundation of theory and practice has been laid are the pupils to read the works of those poets who treat of country lore. The next stage is to lay the foundations of philosophy and ethics, the knowledge of virtue and the hatred of vice. Plato, Xenophon, Cicero, Plutarch, are to be read, not for their language only, but for the ethical teaching which they contain. After ethics succeeds rhetoric, to form the tongue and the imagination of the future orator. Italian is used to give a soft and melodious pronunciation; Greek and Latin tragedies, with the humanists the food of school-boys, are reserved for the completion of the rhetorician's art. To this succeeds the study of politics, learned from the great masters of law from Moses to Justinian, continued down to the laws of our own constitution. Sundays are now to be spent in the higher branches of theology, and the scriptures are to be read in their original tongues. Not till now comes the study of history and poetry, mixed with a certain amount of logic; and then, and not till then, are the scholars permitted to write for themselves. Original composition, instead of being, as among the Jesuits, the principal mental discipline even of young children, is to be reserved until the mind has been thoroughly penetrated both with matter and with manner.

A large portion of the proposed training is devoted to exercise. "In those vernal seasons of the year," says the poet, "when the air is calm and bracing, it were an injury and sullenness against nature not to go out and see her riches and partake in her rejoicing with heaven and earth. At this time the pupils might ride out with prudent and staid guides to all places of strength and commodities of building, and of soil for towns and tillage, harbors and ports for trade." Milton, in this vision of the future, does not intend to sketch a scheme of popular education, but one suited for select pupils and select teachers. It is strange that the advice of one who was himself a schoolmaster should have been so much neglected by the brothers of his profession. This may be explained by the fact that Milton wrote for an age in which Latin was the universal language, the common means of communication between scholars. The troubles of the seventeenth century left little room for the application of his theories; and, when society had become sufficiently settled to adopt them, Latin had lost its place in the world of learning, and the standard of humanism had been raised aloft by the Jesuits.

The establishment of realism as an integral part of education is due to the French revolution, and it is inseparable from the name of Pestalozzi. There could not be a greater contrast than be-

tween Milton and Pestalozzi. Milton's educational scheme was derived, on the one hand from his poetical imagination, and on the other from his scorn for the shallowness and frivolity of some of the statesmen with whom he lived. Pestalozzi learned the principles of his art in the care of poor orphans and in the hard experience of his own checkered life. Milton's plan, like that of Plato, was adapted for a select number of rulers. Pestalozzi's plan was framed for the benefit of very little children, and has only been gradually seen to be applicable to all departments of education. In the year 1798 the village of Stanz, near the lake of Lucerne in Switzerland, was burned by the French, and a great part of the inhabitants murdered, because they would not receive the constitution offered to them by the directory of Paris. The children who escaped the slaughter were left homeless and orphans, and Pestalozzi was asked to take care of them. He established himself in a large deserted convent, deprived of all means of sustenance. He lived with the children by day, and slept with them by night, sharing the poor food which could be got together for their common support. It was by this close contact with the child-mind that Pestalozzi, almost himself a child, learned some of the deepest secrets of education. No traveller should look down from the Rhigi upon the valley where Stanz lies, without reverencing it as the birthplace of educational ideas which are destined to revolutionize our system of training. Yet when I rang, a few years ago, at the convent-gate, the good sister of charity who opened the door for me had never heard of the name of Pestalozzi, and knew nothing of the great Christian work which had been carried on within her walls. The central idea of Pestalozzi was to train the mind through the senses. Humanism, dealing with words alone, had depended mainly upon the memory. Children learned long lists of Latin and Greek nouns, long rules of Latin and Greek construction. Pestalozzi had no books. One of his best materials for instruction was an old piece of tapestry embroidered with animals. The children were taught to see, to touch, to taste, to smell, and to report exactly what their senses had taught them. By ingenious methods the first simple operations of the senses were made to lead insensibly to the higher operations of the mind. Milton had recommended that the rudiments of mathematics should be taught playing, as the old manner was. Pestalozzi made this plan a reality. Pestalozzi taught us to make the fullest use of a keen observation of young children, of their quick apprehension of what immediately surrounds them, and of their surprising power of retaining what really interests

them. He also taught us to follow, in the most loving and even servile manner, the growth of each child's mind, and of the child-mind as a whole. Yet it cannot be said that he was very successful as a practical teacher, and many who have posed as his disciples have been great failures. To force children by compulsion to learn many things by heart is the easiest, and it is also the most stupid and the most unfruitful, method of education. To follow the growth of their minds, and to adapt the training at each instant to their needs, require the patience of a saint and the insight of a philosopher, and these qualities are seldom found.

Fröbel may be regarded as one who has worked out with great minuteness and success a particular part of Pestalozzi's teaching. The kindergarten system, as it is called, rests upon the assumption that the senses of a child are to be first dealt with, and that it is by their means that the intelligence can be best aroused. Fröbel, starting with the care of very young children, was able to reduce their education to something like a system. They are taught by degrees to see clearly form and color; to imitate them in various ways; to distinguish by the touch hard and soft, cold and hot; to train their ears to delicate sounds, and their mouths to refined and expressive speech. Their restlessness is utilized for social drill and dances. A child is encouraged to imitate just what he understands, and no more. It is impossible to see a kindergarten class, even when composed of the youngest gutter children, without feeling that this must in time be recognized as the only fit education for the infant-mind.

But it is a mistake to suppose that the principles of Fröbel are applicable only to the training of very young children. It is as natural for the brain to grow and to exert itself as it is for the arms and legs to stretch themselves. Our inherited traditional methods of education are too often the swaddling-clothes of the mind, which impede its growth rather than assist its development. In schools higher than the kindergarten we have yet to learn that pleasure is a far more potent instrument of training than pain. Many teachers value lessons for their very harshness and repulsiveness, and take no pains that the mind should pass easily from the known to the unknown with ever-growing delight and satisfaction. Far too much stress is laid on mere memory. Memory depends on interest. Children will recollect accurately whatever has deeply roused them at any time. If we secure interest, memory will follow of itself. Again: schools spend far too much time on a set course of study. Pestalozzi and Fröbel learned all they knew by the

slavish following of the growing mind. It is probable that in no two minds do the faculties develop in precisely the same order. That curriculum is best which is adapted to the greatest number of minds, but no curriculum could be adapted to all minds. Just in proportion as the course of study laid down in school is rigid and unalterable, so far will it fail to reach a large number of those for whom it is intended. Just as, in elementary education, payment by results is opposed to the whole spirit of Pestalozzi's and Froebel's teaching, so in our higher education we cannot obtain the highest level of instruction unless we assign a lower place to examinations.

There is no fear that in the present day realistic education — the learning of things instead of words — will be neglected. There may, indeed, be a danger lest we should teach things which are not the best worth learning, lest we should waste on mechanical arts or on the lower branches of science powers which ought to be applied to the highest products of the human mind. Goethe tells us that Wilhelm Meister, a dreamy enthusiast, took his son Felix to be taught in the Paedagogic Province. On returning a year afterwards to see how he was getting on, he could not at first find him; but, as he was in an open field, he saw in the distance a cloud of dust. The dust developed into a troop of horses; and out of this troop galloped the young Felix, riding a white bare-backed steed, from which he threw himself and fell at his father's feet. The rulers of the Province explained, that, having tried Felix at every thing else, they found that he was most fit for breaking horses, and therefore set him that task. We now see Goethe's dream realized, not only in technical education, but in the schools which are growing up over England for the training of young colonists. A boy is taken at fourteen, and taught how to build a house, to make his furniture, to manage a farm, to navigate a boat. This is realistic education with a vengeance; and the same might be said of mere technical training, where it does not rest upon the basis of general culture. Yet the extravagances to which this side of education may run are slight, compared with those which have for so many years formed the bane of humanism. Some exaggeration is required to redress the balance. It is difficult to secure improvements in education, and it is almost impossible to revolutionize an educational system. Educational theorists write as if a single child, willing to be taught every thing, were dealt with by a teacher able to impart every thing. The reality is very different. Children are taught, not singly, but in masses; and in a crowd the standard of conduct is generally that of the worst

rather than that of the best. To secure all the attention of a large number of children needs considerable gifts, and to force a large class into active co-operation with the instructor is what few teachers can do. Again: a small proportion only of teachers have any special gifts of insight, liveliness, or imagination. They can only carry out the methods in which they have been trained. Once more every traditional system is protected by a large number of means and appliances for study which have grown up under its reign. The very perfection of the school-books makes it easier to study classical literatures and Greek and Roman history than any similar department of more modern date. The passive resistance of pupils, the absence of useful aids, the want of enterprise in teachers, — all militate against the substitution of a rational education, such as Comenius would have given, for the complete and elaborate drill in the arts of expression which we owe to Sturm and the Jesuits. America has been less spoiled than Europe by the influence of petty traditions; and it is there, perhaps, that we may look for the rise of a training which will begin with the kindergarten, will be inspired in its higher branches by the enthusiasm of Milton, will always pierce through the veil of words to the substance which the words are intended to convey, and, while training to the full the senses of the individual and his mechanical powers, will not fail to set the highest value on the best products of the human mind, and will never, in the pursuit of material science, undervalue the far dearer treasures of poetry and philosophy.

OSCAR BROWNING.

TRAINING OF TEACHERS.

THE history of our normal schools is the inside history of the progress of education in the United States. Established by prolonged struggles, maintained by continual contests, they have been the central point of onward movement. Circumstances have made them, at the best, but half-measures for the training of teachers. State normal schools are excellent high schools, and a little more. The general standard of admission is that of graduation from grammar schools, eight or nine years' course. Two years are spent in regular high-school studies; the third year a partial course in pedagogics and methods is begun; and the fourth year, psychology, pedagogics, methods, and practice form the principal work. Compare this with preparation for other professions, — four years high school, four years college, and then the law, medicine, or theological school. Rarely can a pupil study psychology with any profit until the

high-school course is finished. Very few pupils can grasp the laws of mind until they are more than twenty years of age. Without psychology, any comprehension of the science of education is impossible. Without this science, imitation of methods is the only resort. One in ten or twenty by inherited and acquired power may have the strength to understand principles: such graduates go on with their studies, and make efficient teachers.

The need of the hour is the establishment of purely professional training-schools, — schools that would take rank with the best law and medical schools. The normal schools themselves suffer greatly for lack of strong, broadly educated, professionally trained heads. A principal of a New England academy, without a spark of professional training, goes into a great western territory to take charge of a normal school, and help lay the foundations of the educational system in a new state. In another profession he would be called a quack: in ours it is almost a necessity, because trained efficient teachers, capable of taking the lead in education, are exceedingly scarce. Few superintendents and principals have had any training for their work. A graduate of Harvard or Yale is just as well fitted to enter the pulpit, the law, or to heal the body, as he is to take the head of a school. In some large cities — Boston, for instance, which has one of the best training-schools in the country — many women teachers know far more of the science of education than their principals.

There is a crying need of safe leaders in education. There never was in our history comparatively a tithe of the earnestness, enthusiasm, and general awakening in the cause of education, as there is at present. This vast energy is spending, and will continue to spend itself in the superficial study of methods, devices, and general details of management and organization, unless there are means offered for a far deeper and broader study of the laws of human growth and the principles of teaching which spring from them.

The present normal schools, struggle as they may and do, cannot well grow into the needed purely professional schools. The rural districts look upon them as convenient, cheap, and good high schools; and rural legislators will continue to hold them to that line of work: the normal element must necessarily be secondary.

Let New York or Pennsylvania, for instance, found one professional training-school. Find a head first, — a very difficult task. Give the principal two or three excellent assistants. Take a whole village or small city for a practice department. Admit upon a rigorous examination only

graduates of colleges, normal schools, and high schools, of full four years' courses; admit, too, teachers who have made themselves efficient by three years of successful teaching. Make the school the central point and place of meeting of the county superintendents. Allow them to spend all the time they can command in study at the school. The course is indicated by the term 'professional training-school.' History of education, psychology, pedagogics, and methods should make up the curriculum.

Any teacher or superintendent, of whatever age or standing, could go to such a school with no sense of degradation, just as De Garmo and Seeley went to Stoy's famous Lehr Seminar at Halle. If Stanford could be induced to found, with his proposed university in California, a school like the one outlined above, he would confer upon his fellow-men a priceless boon. Rich men are constantly giving immense sums to sectarian schools, technical schools, academies, and colleges. Oh that some rich man would die for a professional training-school for teachers!

FRANCIS W. PARKER.

I. There are many who see no necessity for such training. A knowledge of the subjects to be taught is thought all-sufficient. But the time when the ignorance and vice of the teachers made them an article of public vendue,¹ or when they followed teaching because they were fit for nothing else, is a thing of the past. A great school system has been built up; the masses of the people are more enlightened, and they demand qualified workmen, though they may not, and in many instances do not, understand the need of professional schools in which to train these workmen. Nor is this demand for competent teachers unreasonable. Better qualifications for any business or profession are required now than were required fifty years ago. We have training-schools for nurses, for cooks, for clerks, for the trades, for farmers, as well as those for the learned professions. The medical student, even after his graduation, feels that his preparation for the practice of medicine has not been completed, and that the people are not yet willing to trust him. Nobody doubts that he has learned the facts necessary to be known; but he has yet to learn to use these facts, to do which he places himself under the special training of a competent teacher, — enters into partnership with a successful practitioner. The lawyer and the clergyman often pursue the same course. People do not question the wisdom of such policy. They commend it, be-

¹ See Report of commissioner of education for 1875, p. xx.

cause they realize that to know a thing is altogether different from being able to do it. Why should the teacher be an exception to a course so commendatory to the good sense of the people? Certainly it is not because the mind of the child is esteemed of less worth than his body or his estate. He, also, must have this training.

II. But of what shall it consist? Not simply of a knowledge of the facts to be taught, nor even, in addition to this, a knowledge of how to teach. Many a one who cannot teach, knows how. School officers ought to know how teaching should be done, but it is not at all necessary that they should be able to do it. Of far greater value than professional knowledge is professional ability. Mere theoretical teaching does not give the power to act. This power comes only from acting. It is true that the young teacher may acquire it in the school-room, and the practice, though often very painful to him, is exceedingly valuable; but the multiplicity of failures to every successful experiment makes it very hard upon the school. Instruction in the matter to be taught, and in the methods of teaching it, should be accompanied by practice in teaching. Nor should this practice at first be in a model or practice school, but in classes whose pupils have already developed their modes of thinking, and formed their habits of study and recitation under the instruction of superior teachers. Little harm beyond the waste of time can come to them from the misdirected efforts of the young teacher; but such would not be the result of his efforts in the ordinary model school composed of little children. During his senior year in the training-school, the young teacher should spend one hour a day in the practice-school, teaching under the direction of his professor, applying the theories he has learned. Not only this: as soon as he enters the training-school, he should be required to examine every question from the stand-point of the teacher as well as from that of the pupil. In every recitation he should play, in some important respects, the *rôle* of teacher. The object of professional training is to enable the teacher to use his knowledge. This it can hope to do successfully only as it gives him exercise in using knowledge, under the direction of an experienced teacher.

NELSON B. HENRY.

THE professional training of teachers has become a necessity in all of our large cities; and the time is not far distant when the same will be true in every city, town, village, and district. There is no longer any doubt but that teaching is a service, hence there is no longer any reason why the teacher should any longer be subjected to little petty 'quiz' examinations every few weeks

in order to retain his position. Fix the standard of scholarship high; and when one has credentials from any well-known authority, accept it. On the other hand, however, see to it that those who are to train the immortal souls of our children know the difference between the instinct of a dog and the human mind. Too many teachers teach a human being the rules of arithmetic by exactly the same method they would teach a dog to 'speak' for a piece of bread and butter, or a parrot to ask for a cracker. As well might a lawyer endeavor to practise law with no knowledge of the statute laws of his state, or a doctor to practise medicine with no knowledge of physiology, as a teacher to practise the profession of teaching with no knowledge of the mind he is trying to shape.

The teacher who has no knowledge of child-nature should make this his first study; for the man or woman who has forgotten how he or she felt as a child, is hardly calculated to teach. Certainly no such person is fit to be the disciplinarian of children.

A person trying to be a teacher, with no knowledge of the principles of psychology, is like a little tug-boat pulling and tugging and puffing with might and main to get the 'pupil' in the right place; while those who go at their work understandingly take the place of the rudder, and guide the pupils in the right direction to help themselves through.

Let not those who are engaged in the professional training of teachers think their work all done when they have filled their pupils with theories. As well might they lecture on the art and science of swimming, and at the end of six months cast their pupils off the Brooklyn bridge to swim ashore, and expect them to do it, as to expect such pupils to do good work in the school-room.

The practice must go hand in hand with the theory. No student in a medical college can receive his diploma until he has passed a certain number of weeks in the dissecting-room. Neither should a student of psychology receive his diploma until he has had a number of weeks' experience in the class-room. We sometimes think it a pity that the mistakes of the pupil-teachers in the class room do not, like those of the student of medicine in the dissecting-room, fall back upon themselves, and not upon their innocent little subjects. Were this the case, thousands of mistakes that have been made would have been avoided.

We often hear it said that teaching school belittles a man and sours a woman. To this we take exception, and say that it is the 'narrow

school-keeper' that belittles the school. The true, high-minded, hard-working, untiring, conscientious, progressive, enthusiastic, God-fearing teacher never belittles the school, society, or himself, but raises the standard of each.

Perhaps before closing we should explain one of those adjectives, viz., 'enthusiastic.'

We certainly think the professional teacher should be enthusiastic; because those who accomplish the most good are those who have energy and enthusiasm, and show by their work that they are in earnest, and believe what they do to be worth doing well. There is a difference, however, between a demonstrative and an enthusiastic manner. To be *noisy, flighty, or fussy* is not to be animated. Animation or enthusiasm is earnestness without undue excitement.

WILLIAM M. GIFFIN.

INDUSTRIAL TRAINING IN THE PUBLIC SCHOOLS OF GERMANY.

My observations on the industrial training of the public schools of Germany are chiefly confined to the city of Darmstadt, the capital of the grand-duchy of Hesse-Darmstadt.

For many years the court of this grand-duchy of Hesse has drawn to the capital the representatives of the best education and culture; and its school system is undoubtedly the fairest model in central Germany.

Besides its common public schools, the city contains a polytechnic school, a gymnasium, a realschule, a school for the higher education of girls, several private schools, and a number of kindergartens.

To the noble efforts of the much-lamented Princess Alice may be largely attributed the interest that, since her death, has been taken throughout Germany in industrial training for girls. As soon as Princess Alice came to Darmstadt, she made her influence felt. The Alicen-Verein was organized with the princess as president, and Fräulein Louise Büchner as vice-president. This Verein is an association of women, whose object is to impart instruction in the various duties of housekeeping to mothers and their daughters, and to encourage them to better morals and habits of life, and inspire them with a higher ideal of w. Tomanhoodhis association started an entirely new and popular interest in girls' hand-work, — that kind of industrial training for girls which is now one of the regular branches taught in all the public schools of Germany.

In a country like Germany, with a dense population and with a sharp competition in all the de-

partments of labor, with enfeebled natural resources, the only temporal salvation for the masses is work, — patient, continuous, and remunerative manual labor. Now, when this work is performed by an educated and skilful hand, it is plain that its effectiveness is enormously increased. The boy who has received industrial training is more apt to learn a trade; he is better prepared, as the masses must be in all countries, to make a living with his hands; he will be a happier man, more contented, and less willing to leave his fatherland and emigrate to foreign lands. These are undoubtedly some of the strongest reasons why the German government shows such a solicitude for the industrial training of its youth. At Darmstadt, a few years ago, several private citizens made an experiment in giving industrial instruction to boys after school-hours. The results of the experiment were such convincing proofs of the needs of such instruction in every city, that the institution was incorporated, and became a branch of the public-school system, although no special provision had been made in the school law, such as had been made for the industrial training of girls.

The manual-training schools are intended for that class of boys — and a very large class it is in every city — that idle away their time before and after school on the street, where they learn more readily the vices of the depraved than the virtues of the good, and so counteract whatever of honesty, patience, perseverance, kindness, and obedience the teacher at school may attempt to inculcate. This is the reason why the boys in our country, as well as in Germany, who have to work before and after school, make the best progress in their studies, and are the most obedient, and give least trouble to the teacher at school.

In Germany the schools close the daily session at about 2.30. After this time, the boys who, either through poverty or the indifference of parents, are not properly and healthfully employed, must attend the industrial school for the rest of the day. In the industrial school at Darmstadt, in the summer-time, the boys are put to work in the different gardens belonging to the institution. They are divided into classes or companies, each under the supervision of a teacher. One day I saw a company of boys, about twenty in number, between the ages of nine and ten, engaged at transplanting cabbage-plants, and for the first time in my life did I discover that there is an intelligent way of doing work even as trifling as this seems to be. In another part of the garden a company of older boys was preparing the ground for a new crop: the work was likewise systematically and even scientifically performed. In other

parts some were weeding, some were watering plants; others gathered fruit and vegetables, and prepared them for the market. The flower-garden is the most interesting part to the stranger. Here I saw a company of boys laying out ornamental flower-beds. Beauty, taste, and skill, coming from such young hands, fill the stranger with admiration.

At other seasons of the year the boys are engaged at various light crafts in work-rooms, such as the making of baskets, brushes, brooms, etc.; light and plain carpentry, where the use of tools is taught. The hammer and saw are the principal tools for the younger class: with these they are taught to drive nails and saw boards at various angles. Type-setting and book-binding are taught to the advanced and older classes.

Each boy receives a small remuneration for his work when it is faithfully and obediently performed. The money, however, is not directly paid to him, but is put into a savings bank for him; and from time to time he receives his certificates of deposits, which the boy, with a face all aglow with inexpressible delight, carries home to his parents for safe keeping.

As the industrial training of boys requires grounds, extra buildings, tools and appliances, and in many cases extra teachers, it can only be indirectly connected with the public schools. And although the government encourages manual training for boys, there are great difficulties in the way of making it universally obligatory. For this reason it is not mentioned in the school law as one of the regular branches to be taught in the public schools, but must be left entirely to private and municipal efforts, with indirect aid from the government. But girls' manual training, or, as it is called in Germany, 'female hand-work,' presents none of these difficulties; so that it finds a place in the school law. The following is a translation of article 12, p. 6, of the school law of the grand-duchy of Hesse: "The following are the branches to be taught in the common public schools: religion, reading and writing, composition and grammar of the German language, arithmetic, mensuration, history, geography, natural history, vocal music, drawing, gymnastics for the boys, and for the girls instruction in female hand-work."

Female hand-work, however, is no new thing in the public schools. From the very earliest times of school history, girls have been known to take their knitting and sewing to school; and in our country, in the early part of this century, not only the girls, but the boys also, used to knit their own stockings at school. But the work then performed had no educational end in view.

The industries were yet undeveloped, and every family was obliged to manufacture its own clothing. Each member of the family had to lend a helping hand, so that the work done at school seems to have been performed through necessity.

This is not the case with the hand-work performed in the schools in Germany now. Its purpose is purely an educational one, — to train the hand, and develop its cunning. And to guard against selfish and calculating tendencies, the pupil is not permitted to make any thing to be worn by any one; for nothing is more mischievous, and more directly opposed to the harmonious development of a child's mental powers, than a calculating motive, — the motive whose chief outlook is material gain. This manual training is pursued for its own sake, as a mental and ethical discipline, and by no means for its economic value.

The parent furnishes the child with the needed material, which, when the child has finished its course, may be as useless as the paper upon which it has written its language-exercises. And yet, for all this, no one complains that it does not pay. The benefits of industrial training are best understood by the authors of school law. From another page of the school law I make the following translation: "Female hand-work is not only to have a practical purpose, bearing upon the proper management of a home, but it must also tend to train girls early to habits of usefulness, and to develop the virtues of endurance, patience, industry, economy, and benevolence, and to refine the taste for order and for becomingness in dress."

The instruction is based upon philosophic principles, and is imparted in a systematic manner. None others but teachers who have taken a thorough course in the industrial-training schools for female teachers are permitted to teach at all; and when you enter a room, no matter whether it be the lowest primary or the highest grammar, you will find a teacher there who understands her business thoroughly.

Two to three hours each week are given to industrial training, generally on Tuesday and Thursday afternoons.

Knitting is the first exercise, and the ordinary forms of meshes are continued throughout the seventh year. Sewing is next introduced.

Among the first lessons in sewing are the use of the thimble and scissors, threading the needle, and the ways of holding the cloth while sewing and cutting; a lesson is also given upon the different kinds of thread. The stitch-lesson is first performed on paper: after a while, a cheap kind of muslin is substituted. Every lesson is made a class drill. The children work by dictation: all

in the room do the same work at the same time. Every new mesh or stitch that is introduced is first illustrated by the teacher before the class, on a frame which is high enough for all to see. It is rectangular, two feet by eighteen inches. Heavy threads or cords are drawn through its sides, crossing each other at right angles. After the seventh year, crocheting of loose, open, and close meshes, with one-colored yarn, is introduced. Next party-colored yarn is used, from which various beautiful figures are made, which gradually leads them to crochet articles of many beautiful patterns.

From the twelfth to the fourteenth year (the last year in the public schools), sewing is the chief branch. The patching and mending of torn garments is most thoroughly taught. In the last school-year the cutting and making of underwear is taught.

The specimens of work that come from those young hands are simply wonderful in points of neatness, skill, and taste. Any generous-minded person will be at once convinced that the capacity for happiness in those young girls is far superior to that of the class who have never been taught any thing else than mere book-knowledge.

SEBASTIAN THOMAS.

THE TEACHING OF ALGEBRA.

AMONG the papers lately presented to the Education society of London, is one on the teaching of algebra, by W. H. H. Hudson. It contains a great many passages of universal application, and such deserve to be reproduced in this country for the benefit of our teachers of mathematics. Mr. Hudson first answers the question, Why teach algebra at all? and, while fully recognizing the utility of algebra, he maintains that algebra is not to be taught on account of its utility, nor to be learnt on account of any benefit which may be supposed to be got from it, but because it is a part of mathematical truth, and no one ought to be wholly alien from that important department of human knowledge.

The next question is, When should algebra be taught? The answer is, At an early period of intellectual development. The reason for this is that algebra is a certain science, it proceeds from unimpeachable axioms, and its conclusions are logically developed from them: it has its own special difficulties, but they are not those of weighing in the balance conflicting probable evidence which requires the stronger powers of a maturer mind. It is possible for the student to plant each step firmly before proceeding to the next; nothing is left hazy or in doubt: thus it strengthens the

mind, and enables it better to master studies of a different nature that are presented to it later. Mathematics give power, vigor, strength, to the mind. This is commonly given as the reason for studying them. This is also the reason for studying algebra early, that is to say, for beginning to study it early. It is not necessary, it is not even possible, to finish the study of algebra before commencing another. On the other hand, it is not necessary to be always teaching algebra: what elementary teachers have to do is to guide pupils to learn enough to leave the door open for further progress; to take them over the threshold, but not into the innermost sanctuary.

Children younger than nine will rarely be fitted to take up algebra; and, on the other hand, it is seldom advisable to defer its commencement until after twelve years of age. Certain preliminary acquisitions are essential for this study. The first of these, in Mr. Hudson's opinion, is the power of listening.

"By this I mean the habit of attaching an idea to what is said. Some pupils—I hope no teachers—consider it sufficient if the pupil can reproduce the words that have been used, without attaching any idea to them. Such pupils will not learn algebra. A pupil who has the habit of listening will not allow a teacher to use unintelligible language, and will be of great use in a class by stopping the teacher and asking for things to be repeated and strange words explained. It is difficult for a teacher to realize that sometimes he is using a vocabulary beyond his pupils. Interruptions of this kind, which show that the pupils are listening, are of great help to the teacher.

"This leads to the next essential preliminary: the student should be able to speak. I do not mean that a deaf-and-dumb person cannot learn algebra, but he can only be taught under great disadvantages. Thinking of the ordinary run of boys and girls, I say that they cannot learn algebra until they have learnt to speak. By speak, I mean can ask questions and can answer questions, can say what they know, and can point out what to them is obscure. It has been well said that a pupil who cannot ask a question in his natural voice is unteachable: my own experience confirms this. Some pupils put on a lecture voice, in which they answer questions put to them. I do not call this speaking. It is unnatural and artificial, and is a serious bar to progress. It arises from timidity, fear of the teacher, or fear of the rest of the class; and the latter is far more difficult to be got rid of than the former.

"Moreover, a pupil must have a sufficient command of language to be able to frame a complete sentence. I have heard of teachers who are satis-

fied with a single word as an answer, and who habitually put their questions so as to admit of such an answer. This does not encourage the art of speaking in the pupil; in fact, it destroys it, and is not to be commended.

"A third preliminary is the power of reading: this is far more difficult, and far more usually absent, than the preceding. Many a boy who can listen and speak has no idea of reading. He can, it is true, form the sounds appropriate to the words he sees, but he has not the habit of using a book as a mine of information, of reading in order to get the sense: his main idea too frequently is that of learning the sound of the words, like a parrot.

"There are few more valuable lessons that can be given to a boy than to teach him to read a book, and extract the sense out of it. This is what young children naturally do with their fairy-tales; but when they become school-boys and school-girls, their natural reading seems somehow to give place to a mechanical lesson-reading.

"Now, mathematical reading differs from most other reading in this: that it requires writing. This is the fourth essential preliminary. It is possible, no doubt, for a great genius to carry on all the steps of a piece of algebraical reasoning in his head. The ordinary school-boy cannot do this, cannot pass from one statement of the book to the next without inserting an intermediate step. The boy who has learnt to write, who always, while reading, has a piece of paper and pencil at hand to work out details as they arise, will learn algebra: the one who tries merely to remember the words and symbols of the book will make no real progress.

"These preliminaries of listening, speaking, reading, writing, do not properly come under the head of teaching algebra: they are so obviously essential, that I scarcely need have mentioned them, but in so many cases absent, that I implore those who have the early training of children not to lose sight of them in the vain hope that without them any progress in higher studies is possible.

"Another essential preliminary more distinctly bears on the subject. The teaching of algebra must be based on, and naturally arises out of, a sound knowledge of the principles of arithmetic. In return, the knowledge of algebra will enable a student concisely to express these principles, and to understand them more clearly. On this account, it is necessary that those who undertake the teaching of arithmetic should have a sufficient knowledge of algebra. This is another lower reason for studying algebra; namely, in order to be able to teach arithmetic.

"It is a mistake to teach a pupil any thing that he has subsequently to unlearn; the persistence of first impressions is notorious, therefore arithmetic should not be taught in such a way that it needs correction when algebra is studied. The two are naturally and historically connected; and one who is wholly ignorant of either is apt, also, to be unfamiliar with the other. The teacher should be above his subject, not in the sense of despising it, but as one who looks from a height upon a plain can see the topography of the country more distinctly than one on the lower land.

"Therefore, in the interest of algebra, I protest against the practice of despising arithmetic, of setting it to be taught in schools by persons ignorant of algebra, and, it may be, contemptuous of the subject they have to teach. A teacher of algebra ought to find the ground prepared for him by a sound knowledge of arithmetic; and it would be better, therefore, that the mathematical masters should undertake arithmetic.

"This leads to the next question, Who are to teach algebra? It may, perhaps, be thought by some that a teacher requires to be very little ahead of his pupil, and that one who has slight knowledge is good enough to teach a beginner. On the contrary, the proper teaching of the elements of any subject requires a teacher who has a knowledge considerably in advance. I do not hesitate to say that it would be well that a teacher of algebra should know something—and that something soundly—of the method of co-ordinate geometry, of trigonometry, and of the differential calculus. Teaching should be anticipatory. The algebra taught should be such as to prepare for these higher subjects, and this can only be effectually done by one who is acquainted with them. Moreover, the elementary teaching requires more care and more knowledge than more advanced. Nothing is worse than to lay foundations imperfectly. A necessary qualification for a teacher of algebra is, therefore, a sound knowledge of mathematics considerably in advance of the subject he is teaching.

"Next let us ask, How is algebra to be taught? It is fashionable nowadays, and I do not say it is a bad fashion, to attach importance to the training of teachers in methods of teaching. But I think too much importance can be attached to method. Methods that seem good, and are good when first introduced, seem to lose their virtue after a few years. An energetic teacher will be constantly changing his methods, and adapting them to the various characters of his pupils. Freshness and vigor are far more important qualities. Nevertheless, an unmethodical teacher, who would do very well for a single pupil, is incapable

of conducting a large class. My own personal predilections are in favor of a Socratic system of teaching, by asking questions, and so drawing out, — educating, — the mind of the pupil. I do not regard it as good to tell the pupil every thing. It is our object to train him to exercise his own powers. A child who is always carried will never learn to walk. But a child who can walk cannot get over a stile, and requires a lift now and then. It is a matter of tact to decide, in any particular case, whether the assistance is to be given or withheld. I do not feel competent to lay down general rules. With a pupil who can listen and speak, understanding these words as I have explained them, there is little difficulty in ascertaining whether the supposed inability to proceed arises from want of power or from laziness. It very often arises from want of will, not exactly a downright shirking of work, but a certain deficiency in determination. In such cases a guiding hand is better than a lift.

“That method of teaching is best which most stimulates the mental activity of the pupil, and that is the reason why methods after a time cease to be good: it is just because they are methods, and become mechanical, and so fail to stimulate activity.

“Algebra should be taught as if to an intelligent person. Unfortunately, all the pupils in a class are not equally intelligent. Still, people turn out very much as you treat them: draw out the germ of intelligence, and it will grow. A style of teaching that is based on the supposition that the class is unintelligent, is apt to end in making them so. To this end no slovenly work should be allowed. It is a mistake to look only at the answers of a set of exercises, and not to care about the orderly setting forth of the argument that leads to the answer. This is a practical detail that requires some skill to adjust: the mode of adjustment depends on the size and character of the class. Too much of the teacher's energy is in danger of being absorbed in examining exercises. The benefit of the exercise consists chiefly in doing it, and in so doing it that it needs no subsequent alteration: consequently the correctness of the answer is a most important point. But a practice of merely looking at the answer allows the boys to fall into slovenly habits, and may lead them into the unsound habit of working up to an answer.

“Considerable difference of opinion is expressed as to just how the first steps in algebra should be taken. It may be taken by using letters as general symbols for numbers, treating algebra as a generalized arithmetic; and there is much to be said in favor of this. In this way algebra pre-

sents itself as a language, and this is a view of algebra that ought to be put before the student at an early period. Some of the most instructive of the early exercises in algebra consist in translating general arithmetical statements into symbolic language, and in forming the equations which are the algebraical statement of problems. Simple equation problems can hardly be begun too early.

“On the other hand, the notion of the negative number can be acquired without the use of any fresh apparatus of symbols beyond those that the student has been accustomed to in arithmetic; and, as this is one of the greatest of the early difficulties of algebra, I have sometimes thought it wise to begin with it, so that the difficulty of the negative quantity may be mastered without the complication which the use of letters seems to give to the matter. I think myself that it is more logical to begin with the letters, but that it is, on the whole, easier for the student to begin with the negative quantity. To talk about and explain $5-8$ is simpler to a beginner than the use of a and b .

“But, whatever sequence of the parts of the subject is adopted in teaching, there should be no departure from a logical development. Algebra is built up on certain few axioms, and certain not very numerous conventions. A pupil should be led to see from the first the distinction between what is axiomatic and what is conventional; though, in the latter case, he may be unable, at an early stage, to see the convenience of the convention: he is not a sufficient judge of this, in many cases, till his studies have proceeded much further. But he should be encouraged to see for himself that the propositions of the science are correctly deduced by means of the axioms of which he admits the truth, and no matter should be taught which cannot thus be put before him.

“The gradual extension of meaning which such a term as ‘multiplication’ receives — first in arithmetic, when it is extended to a fractional multiplier; then in algebra, when the multiplier is likely to be negative; and finally in applied mathematics, when we contemplate a concrete multiplier — is a matter which should form part of the teaching of algebra to all, who should thus be led to see that in mathematics ‘impossible’ is a word of only temporary significance. A student who knows only arithmetic is justified in saying that $5-8$ is impossible; but the impossibility is a stile to be gotten over.

“In looking over exercises, it is often more important to look over those that are wrong than those that are right. When an example has been done right, correct in reasoning and accurate in

process, the teacher may look at it to see where the form might have been improved, how it might have been curtailed, what steps were superfluous, and so on. So long as any fault in reasoning has to be corrected, it is premature to examine inelegancies. I do not advise correcting too many mistakes at once. It disheartens a pupil to have too many faults found at once. One mistake in each example is ordinarily enough. The faults of reasoning are to be first corrected, then mistakes in work, and, last of all, mere matters of arrangement. I know that this order is distasteful to some pupils, who like first to be told how to put their work down. I recommend the other order: let them first reason out the proposition in the way which they can follow by themselves, and make no mistake about it; then they are able to appreciate the advantage of particular modifications of their process that a more experienced mathematician may suggest to them.

"As an example of what I mean, I may refer to division by a binomial factor, such as $x - a$. A pupil will at first naturally imitate long division in arithmetic; he may then be shown how the abbreviated, or synthetic method, as it is called, is a mere re-arrangement and curtailment of what he has done before; whereas, if he had been taught the shorter method as a rule from the first, it would have been a mere un-understood rule of thumb.

"It has been for a long time my practice, due to a hint from the late Mr. Todhunter, always to require to see an attempt and an exact statement of his difficulty from a pupil, of any problem that he says he is unable to solve, and which appears to me to be within his reach. The reason is, first, that I may see where the precise difficulty is, and so know what it is that I have to explain; and, still more, because in the act of setting forth the difficulty the obscurity has a habit of disappearing. A student may think he is unable to solve a problem because he cannot see his way from the beginning to the end; but he can generally draw some conclusion from the data of the question. I can then give him just the help he needs, whereas otherwise I am liable to explain to him what he really understands, not knowing what it is that stops him.

"The influence of examinations is not wholly bad, as at first sight one might be tempted to think. A teacher who has not the prospect of an examination of his pupils before him is apt to think that it is sufficient if his pupils understand the subject, and that requiring them to reproduce it is superfluous. In this they are liable to lose the great advantage which the necessity of writing out would have given them, and the teacher

is extremely likely to credit them with a knowledge that the examination would have shown that they do not possess. As a test of knowledge, then, an examination is useful; nay, it is most valuable. But when the examination is made an end in itself, and when the object aimed at is to produce a semblance of knowledge to deceive an examiner, where the reproduction is made a primary object instead of a secondary one, in subservience to the mental education, then the influence of the examination is mischievous.

"However intelligent and teachable a pupil may be, he will occasionally make mistakes. The commonest forms of these annoying but comparatively innocent mistakes are miscopying either the question or their own work, arithmetical slips, and mistakes with the signs $+$ and $-$. These mistakes do not always imply ignorance or inattention, and a teacher is unwise to attach too much importance to them: a few of them are quite consistent with a sound appreciation of principle. The effort should be made to undermine the causes of these faults, rather than to correct them when made. The chief of them is hurry. This is a growth of our age which sends down the fibres of its rootlets even to the minutest arrangements of school-life. Set before your pupils that accuracy is preferable to pace; accustom them to the habit of exact speaking and writing, even to the dotting of *i*'s and crossing of *t*'s, — and such faults will largely disappear."

THE STUDY OF LANGUAGE.

HUMAN language is wholly a psychological process. As von Humboldt long ago pointed out, it is nothing innate, but a function; it is no concrete object, but exists only in the soul of the indi-

Die praktische Spracherlernung auf Grund der Psychologie und der Physiologie der Sprache. Von FELIX FRANKE. Heilbronn, 1884.

'Sprachentwicklung, Spracherlernung, Sprachbildung,' von F. TECHMER, in *Dreizehnter Bericht über die höhere Schule für Mädchen zu Leipzig*. Leipzig, 1885.

'On the practical study of language,' by H. SWEET, M.A., in *Transactions of the Philological society*, 1882-84. [The President's annual address for 1884.] London, Trübner, 1885.

Der Sprachunterricht muss umkehren! Ein Beitrag zur Ueberbündungsfrage von Quousque Tandem (Wilhelm Viëtor). Zweite um ein Vorwort vermehrte Auflage. Heilbronn, 1886.

'Techmer's und Sweet's Vorschläge zur Reform des Unterrichts im Englische,' von H. KLINGHARDT, in *Englische Studien*, band x., heft i. Heilbronn, 1886.

German pronunciation: practice and theory. By WILHELM VIËTOR. Heilbronn, 1885.

Elemente der Phonetik und Orthoëpie des Deutschen, Englischen, und Französischen mit Rücksicht auf die Bedürfnisse der Lehrpraxis. 2d ed. Von WILHELM VIËTOR. Heilbronn, 1887.

vidual. In the same way, the language of the individual is to be defined as a psychological activity associated with movements of the organs of speech,—its physiological side. Every individual has his own language, as he has his own ideas; and from analogous causes, as each nation has its own manner of ideal conception, so it expresses the same in its own peculiar way, and also finds different sounds for the physiological form. To learn a foreign language is, accordingly, not merely to acquire a foreign vocabulary whereby to translate one's preconceived notions, but it is to penetrate into a foreign mode of thought which alone is capable of suggesting its own individual form of expression. As Techmer asserts, "He who, in any case, will speak rationally, must think. He who will learn to speak in a particular language, be it English or Chinese, must learn to think in that language."

All language goes back to associations of the perceptions awakened by the different properties of objects. Out of these associations, at first unconscious, in the course of time, are developed conscious, apperceptive associations in series, combinations, and organized systems. These, in their turn, may serve as centres from which are developed the combinations of human speech,—those of form (inflections, etc.) as well as those of meaning (synonymes, etc.). Upon the mass of unconscious associations thus formed depends the practical command of language; on the conscious, apperceptive, and systematic associations, on the other hand, is based the theoretical knowledge of language. It is to be borne in mind that all associations at first conscious through practice acquire the property of working unconsciously. In accordance with what has been said, language-study, then, may be of two kinds. It may be, on the one hand, in order to attain the practical command of a language, that is, we may seek the language as the form of thought; or, on the other hand, it may be to acquire a theoretical knowledge of language, in which case the language becomes the subject of thought. A child, at the outset, learns language only as the form of thought. The development of consciousness is almost identical with the acquisition of language; or, otherwise stated, idea and word are to all intents and purposes acquired conjointly. Later on, the child learns language through language itself, and not only with the ear, but with all the organs of sense. Every new perception finds an expression in language to describe it; and the idea resulting from the perception is so associated with the word, that the word immediately reproduces the idea, and the idea the word. It is also to be noticed that the formulation of rules of language through the tra-

cing of analogy is taking place unconsciously; that learning the language is proceeding within the boundaries of the language itself; and that the acquisition of the spoken language is the only end in view. One principle, originally formulated by Preyer in 'Die Seele des Kindes,' is of importance for its application elsewhere: the healthy child understands spoken language much sooner than it can itself produce by imitation the sounds, syllables, and words that have been heard. Furthermore, only what is interesting and intelligible to the child is firmly impressed upon its mind: all else is in a short time forgotten. Further to be remarked is the fact that the forms of expression learned by the child are simple, unaffected, and idiomatic.

The problem presented in learning a foreign language for practical use is how to obtain, with the least possible expenditure of time and energy, such a complete mastery of the mechanism of the language that it will, as in the case of one's native speech, unconsciously accompany thought, and become its form. That the case as thus stated has its difficulties becomes at once apparent. In the first place, we can have neither the time nor the opportunity to hear or to speak the foreign language that we had in the case of our own. And even if we have, on the one hand, the advantage of being able to think and to reason, and the knowledge of one language system already acquired, it implies, on the other hand, a direct disadvantage: the native language holds fast our thoughts, between which and their forms of expression there is such an intimate union that it will be found difficult at first to make room for new ones. The organs of speech, again, have been accustomed, through constant repetition, to produce without conscious exertion one system of sounds, which the ear through constant hearing has grown able to differentiate with the utmost sharpness. The foreign sounds, on the contrary, produced on an entirely different basis, are not readily differentiated by the ear, and are only to be imitated by careful practice.

A. H. Sayce, several years ago, in an article in *Nature*,¹ wrote, "Our present system of teaching languages . . . is based rather upon empirical haphazard than on scientific principles." The remark is as applicable as ever. In spite of the progress made in recent years in our knowledge of the fundamental laws of language, and particularly of its phonetics, but little has been done, except in isolated cases, to apply in practice what has been scientifically established beyond all question. While all else has advanced, language-instruction has been content to stand still, notwith-

¹ *Nature*, May 29, 1879.

standing the important position already assigned it among the recognized essentials of education. The striking inefficiency of the old method of teaching foreign languages has been proved year after year by barrenness of result; but nevertheless, if popular text-books are a criterion, language is still taught in the same old way. An attempt is made to learn it only consciously, and letters and the literary language are falsely regarded as synonymous with sounds and the spoken language. Worse than all, with the old method of translation, the foreign language has been studied within the native language; and, while foreign words and forms have indeed been taught, no attempt has been made to teach or to learn with the foreign language the foreign mode of thought.

It is Sayce, again, who affirms axiomatically that language consists of sounds, and not of letters. Sweet, too, insists no less strikingly that language-study is concerned not with dead letters, but with living speech. It is accordingly the spoken form of every language that should form the basis of its study, which should furthermore proceed from the stand-point of the sentence, and not from that of the word. Upon these fundamental points all recent writers on the study of language are substantially agreed. With one exception, the writers cited above would, however, eliminate from the question the factor which I have called the theoretical knowledge of language, and would make its practical command the one end in view. Techmer alone regards the practical acquisition of a language of primary importance, but would base upon it theoretical study with the idea of making the knowledge of the new language more perfect and firmly fixed. What is here of less weight from its bearing on the subject is his characterization of this theoretical study of language as "an educational means of bringing the harmonious and homogeneous development of the mind to its highest possible perfection." The true place which the theoretical study of language should hold is best of all stated by Storm, in his 'Englische Philologie' (Heilbronn, 1881). He would neither eliminate it entirely, on the one hand, nor would he give it undue prominence, on the other. The theoretical, he maintains, is practical in a higher sense, because it facilitates the comprehension and acquisition of the facts.

The pronunciation of a foreign language should form the first stage of its instruction, and this can only be taught on the basis of scientific phonetics. Whether the instruction should proceed at the outset through the medium of phonetic transcription, is a point upon which not all writers

are agreed. Techmer, in the light of his own experience, is against it. Sweet is outspoken in favor of it: he would entirely discard the ordinary orthography, and substitute for it one purely phonetic; and in this dictum he is followed by many others. Vietor has practically applied this theory to German for English learners in his 'German pronunciation,' which is worthy of a wider distribution than it has thus far had in this country: even if it is found impracticable to use it in its entirety as a text-book in the class-room, its material will prove of the utmost value for the wealth of suggestion that it contains. Unproductive as is our whole present system of language-teaching, this matter of pronunciation, which recent writers on the subject almost with one voice maintain should be a foundation principle, is, nevertheless, the weakest element of all. The ordinary text-book gives at the beginning a few pages on pronunciation, unscientific in character, and consequently imperfect and inexact, and utterly inadequate even with constant and painstaking iteration, as every teacher knows, to convey the information desired. In learning the sounds of a foreign language, the course to be followed is from simple sounds to syllables, to words, and finally to sentences. With words and sentences, meanings are also to be associated: such sentences should, further, be the natural sentences of language, which are precisely the ones that cannot be constructed *a priori*. There is no place in language-instruction for Ollendorffian sentences like "The merchant is swimming with the gardener's son, but the Dutchman has the gun."

When the foreign sounds and sound-complexes have once been thoroughly mastered, and not until then, a reading-book, containing connected texts written in the simplest and most colloquial style, and embodying as few infrequent words and phrases as possible, is to form the main foundation for the study of the new language. Sweet expresses himself most definitely as to the arrangement of such a book. It should have, first, descriptions of nature and natural phenomena, of the different races of men, their dwellings, food, and dress, because the elementary vocabulary of material things, phenomena, and actions, is most easily embodied in descriptions of this character; narrative pieces come next; and, lastly, idiomatic dialogues, and longer pieces which combine all three elements. These texts should be, it is hardly necessary to state, both interesting and entertaining, in order perfectly to fulfil their purpose. At the end of this stage of the instruction the learner will have an easy command of a vocabulary, not wide, it may be, in range, but thoroughly prac-

tical in character, and adequate to express the most necessary ideas. The next stage is to consist of condensed treatises on special subjects, such as history, geography, and natural science, after which the learner may gradually choose his texts with increasing freedom, until he is finally able to read the actual literature of the language itself in its original form.

The reading of texts, however, is not the only element of instruction: during this whole time the systematic study of grammar, idioms, and vocabulary is to accompany and run parallel with the reading. As to the true position of grammar in the study of language, there is but one mind. It should be studied immediately in connection with the texts, and, furthermore, inductively. Sweet puts it best of all when he says that "grammar, which is merely a commentary on the facts of language, must follow, not precede, the facts themselves, as presented in sentences and connected texts." But neither he nor the others mean that its systematic study should be deferred longer than the stage when the learner is able to master phonetically the sentences that are given to him. Klinghardt expressly states, that, in his opinion, a purely inductive method of teaching grammar is only suitable at the very beginning, — a dictum in which all practical teachers will concur. Later on, a short grammar, to be learned systematically, should be placed in the hands of the pupil. It should include, however, nothing that is not required for the explanation of the texts, and every rule should have its example. Still later the advanced student might be given a reference-grammar, which should contain all rules.

Vocabulary may be studied with regard to the meanings of words either analytically or synthetically: that is, the word 'good,' for instance, may be taken through its various meanings, — 'pleasant to the taste,' 'useful,' 'morally good,' etc.; or else the idea, for instance, of 'morally good,' may be taken, and the various words and phrases by which it is expressed, like 'virtue,' 'bad,' 'vice,' may be enumerated. The synthetic method thus includes the whole vocabulary of a language. Word-lists are on no account to be studied. Connected sentences, as already stated, should be the medium of instruction. A word has already been said in regard to the study of idioms. Only necessary idioms should at first be taught. For conversational purposes, questions are more necessary than answers; the former, then, should be mastered perfectly, while the latter require merely to be understood.

In the system here elaborated no place is provided for the old mechanical translation method or the grammar calculated to accompany it. A

reading knowledge of a language may doubtless be obtained at the expense of a great deal of labor and time by translating foreign texts. The direct benefit, however, of such a process, is to increase one's own native vocabulary and command of language, — a result, no doubt, admirable in its way, but exactly the reverse of the end desired. A greater evil still arises from giving a learner the literature of a language, be it modern or classical, before he knows its vocabulary and grammar. "What," Sweet pertinently inquires, "should we say of a music-master who gave his pupils a sonata of Beethoven to learn the notes on, instead of beginning with scales?" This very course is nevertheless pursued in our present method of teaching languages. Its effect is often not only to blot out absolutely the beauties of the literature thus unfortunately chosen for sacrifice, but to foster a disgust for literature generally. It would have been a thousand times better for the general culture of the pupil to have given him by and by a good translation. There are many persons whose only idea of foreign literature is an uncomfortable road beset with veritable sloughs of despond, out of which it is only possible to climb with the constant aid of grammar and dictionary.

It is Sayce, already quoted, who points out that the grammar of a living language, like the life of the community itself, is constantly in process of change and development. It cannot, accordingly, be held in by rules that, once made, are to stand forever, as unalterable as the laws of the Medes and Persians. Yet, notwithstanding this indisputable fact, there are still in use numerous text-books whose prototype is the old grammar of Donatus. Such a grammar may possibly have its use as a book of reference, but surely not otherwise. You may know your grammar by rule and paragraph from first to last, and be able to apply it in the formation of sentences, but at the same time be utterly unable to form a single sentence as a native would speak it. The old method is really the study of the grammar by means of the language, as if the former, and not the latter, were the end in view.

In the case of the dead languages the instruction should proceed, as far as possible, on the plan laid out for the living ones; and many recent writers are agreed that the study of Greek and Latin should follow rather than precede the modern languages.

Against the so-called 'natural method,' Sweet takes a decided stand. The very term, he says, is a misnomer, for the learning of a foreign language is as unnatural a process as can be imagined. The genuine natural method, which, if any thing,

would be that followed by nurses and children, is definitely characterized as bad, and, from its wastefulness and absence of system, unworthy of imitation later on. Under the most favorable circumstances, the method is more or less a failure, and the result cannot but be infinitely less productive in the later study of a foreign language, where it is impossible to reproduce those conditions. A language cannot be picked up by ear without systematic study. Even a residence in the foreign country before the elements of the language have been mastered, so far from being advantageous, is positively injurious, as the learner is forced, by the exigencies of the moment, to make use of incorrect constructions, which are afterward difficult to get rid of. Klinghardt characterizes Techmer's system, in so far as it concerns the practical acquisition of language, as an example of the 'rationally developed natural method.' There is here, however, a confusion of terms. Techmer does not concern himself solely with the practical acquisition of language, but makes its theoretical study an important and indeed an essential element. The Montaigne-Sauveur method is distinctly stated by him to take but little account of the theoretical knowledge of language. He might have stated with greater fairness that it takes no account of it at all.

In the foregoing, particular stress has purposely been laid upon the views of Techmer and Sweet, as their importance justly demands. While far apart at some points in the development of their respective systems, the two are nevertheless wholly at one in fundamental principles. Techmer, as Klinghardt notes, shows in his treatment of the question the traditional peculiarities of his nation. He begins, in a sense *ab ovo*, with a psychological consideration of language in general, considers the subject carefully in its whole extent, and makes, rightly, the ideal side, the theoretical knowledge of language, both a prominent means and an aim of acquisition. Sweet, on the contrary, sees the question only from its practical side. He does not attempt to give a systematic exposition of the whole question of language, but, convinced that the aim of language-study should be wholly a practical one, develops with admirable rationalness and common sense a system whose mere practicality cannot be disputed. He leaves a place also for theoretical knowledge, but would make it an end in itself, in that he would place it beyond and above the practical acquisition of a language. Particularly valuable is Sweet's vindication of scientific phonetics as a basis of linguistic study.

However the writers here cited may differ in single points of detail after the first stages of in-

struction have been passed, all with one accord cry out, with a voice that ought not to fall unheeded, for the reform of existing methods. Viëtor is right: 'Der Sprachunterricht muss umkehren!' In what essential points it may be reformed has here been pointed out as much in detail as space would permit. In accordance with what has been said, — as Klinghardt puts at the beginning of his article, — language-instruction must apply, as far as possible, the certain results of modern philological investigation. Secondly, grammar is to be at first studied inductively and in connection with the reading texts: when a systematic grammar is finally taken up, it is to be, as much as possible, limited in extent. Finally, instruction must proceed from the stand-point of the spoken language and the sentence. Reform in the teaching of the foreign languages, ancient or modern, cannot, perhaps, be expected to come all at once, or to come of itself. Old practices are too deeply rooted for the exertions of a few thus easily to overturn them; but surely there is nothing inherent in the old method, that it should be retained if something better can be found to take its place. If the results of present methods of instruction, whether in school, academy, or college, are to be taken as a standard whereby to judge of their efficiency, then reform is needed here as in no other place in the curriculum. The matter has been viewed too long with indifference. The old method is inadequate to supply what is demanded of it. Time that can ill be spared, and the drudgery of hard labor, are spent upon it; and the result, in nine cases out of ten, is now what it always has been, — practically nothing! When existing methods, be they educational or economical, are bad, the rational way is to discard them. If they are bad in part, then discard them in part; if bad throughout, then reject them utterly.

WM. H. CARPENTER.

THE *Athenaeum* states that Mr. H. Howorth, M.P., the historian of the Mongols, is going to bring out a work entitled 'The mammoth and the flood,' in which he endeavors to prove that a widespread cataclysm brought the mammoth period to a close, and that this catastrophe involved a wide-spread flood of water which not only drowned the animals, but buried them, sometimes with their bodies intact, and in many cases along with a crowd of very incongruous beasts, and covered them with continuous mantles of loam and gravel.

— The international astronomical society, *Astronomische Gesellschaft*, meets this year at Kiel on Aug. 29.